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ADVERTISING PAGES REMOVED

The Reason why BWH

BWH Rotocure Process is the only practical method of producing uniform rubber belting entirely free from press overlaps.

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The advantages of continuously vulcanized belts and the economy which they represent in the operation of your plant cost you nothing. BWH belts, made by this process, are competitive in price. You pay no premium for this extra measure of quality and service. It is only necessary to order belting by name and specify the BWH brand which best suits your service requirements.

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BULL DOG
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NO SERVICE TOO SEVERE

WARRIOR
FOR GENERAL
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PERFECTION
NO SPEED TOO HIGH
NO PULLEY TOO SMALL

BOSTON WOVEN HOSE & RUBBER COMPANY

THESE 2 WORDS DO MEAN SOMETHING

RELIANCE ELECTRIC AND ENGINEERING COMPANY

MOTOR-DRIVE IS MORE THAN POWER

When these two words were included as part of our corporate name thirty-two years ago, we were pioneering with an idea that has been a major factor in a steady business growth. We were showing people how to apply adjustable-speed motor-drive to get more production from metal-working machinery.

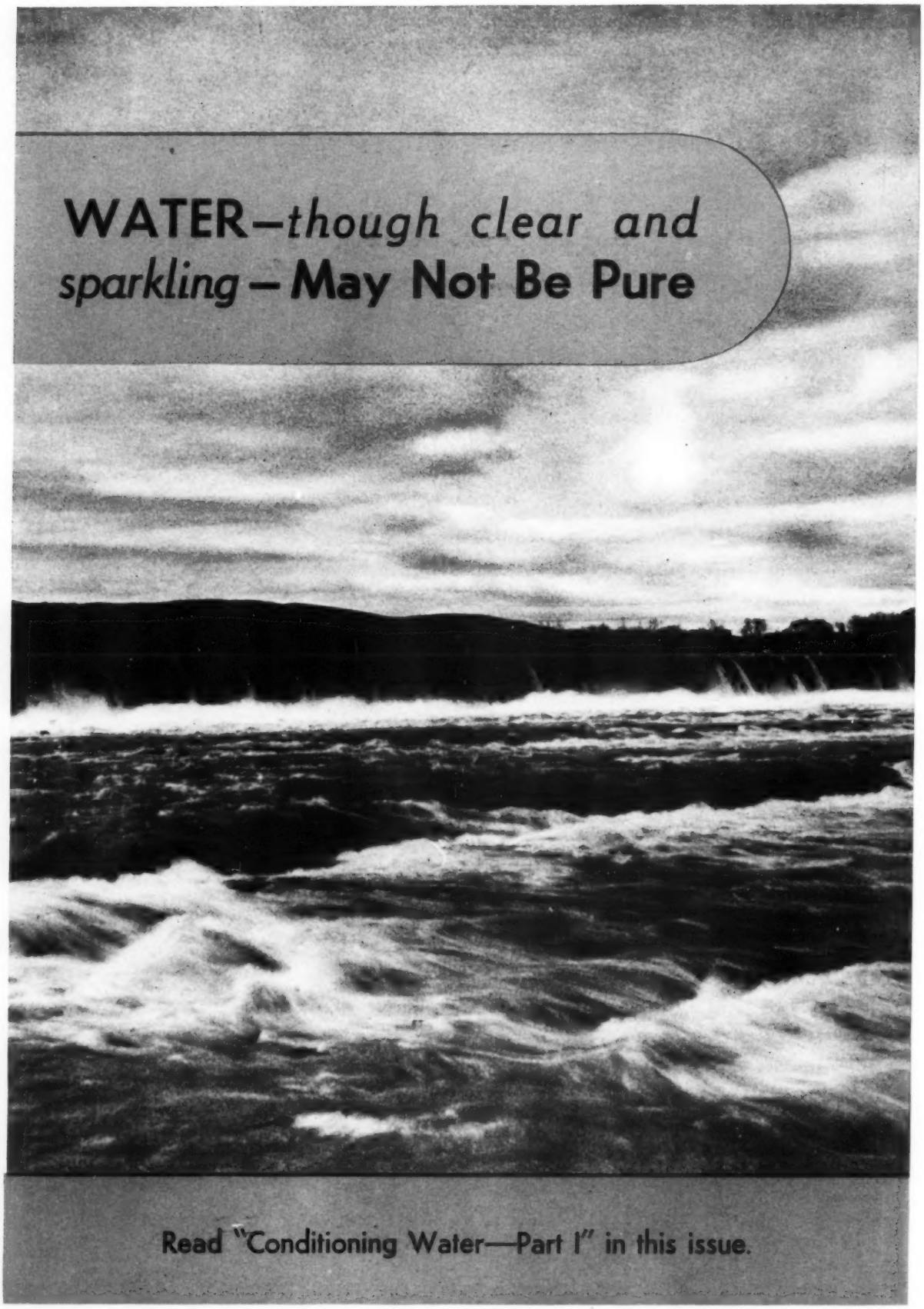
Today, this idea has broadened to include many industries. Reliance men trained to think of motor-drive in terms of production are being invited to sit in and help answer the question, *"What can we get the motor to do besides supply power?"* We haven't all the answers in a book, but we know enough of them to help run down others . . . Yes, we have motors — and we also have ideas that make motor-drive *more than power.* Why not use them?

RELIANCE ELECTRIC & ENGINEERING COMPANY
1088 Ivanhoe Road • • • • Cleveland, Ohio

Type T Heavy-duty Reliance Motor for direct current; ball bearings

Type A.A. Ball-bearing Squirrel-cage A.C. Induction Motor with ball bearings

RELIANCE A-C D-C MOTORS


WATER—*though clear and sparkling*—May Not Be Pure
Read "Conditioning Water—Part I" in this issue.

TRADE WINDS

THREE DIVISIONAL COMMITTEES ARE APPOINTED BY THE OPM

▸▸▸ FORMATION OF three divisional committees which later will be subcommittees of an over-all Pulp and Paper Defense Industry Advisory Committee has been announced by the Bureau of Clearance of Defense Industry Advisory Committees, Office of Production Management.

The three divisional committees named are those for Pulp, Paper and Paperboard; Paper Products; and Printing and Publishing. In the near future, an over-all Pulp and Paper Defense Industry Advisory Committee will be chosen from among the membership of the three Divisional Committees.

N. A. McKenna, of the Division of Production, has been designated Government Presiding Officer.

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Willard Henry, president, Southern Advance Bag & Paper Co., Chicago.

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George P. Brett, Jr., president, MacMillan Co., New York City.

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Edwin Lennox, president, American Colortype Co., Chicago.

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Fleming Newbold, vice president and manager, Evening Star Newspaper Co., Washington, D. C.

E. W. Palmer, president, Kingsport Press, Kingsport, Tenn.

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Elmer G. Voigt, vice president, Western Printing & Lithographing Co., Racine, Wis.

Lee C. Werden, vice president, Cuneo Eastern Press, Inc., Philadelphia.

(Release date, August 16)

"The Changing World"

The structure of the Government's organized bodies and the personnel of those groups are being shifted continuously. Release dates are shown on items herein which announce new setups. The chronology of these items should place them in proper continuity.

—EDITOR'S NOTE

NEW BOARD TO BE KNOWN AS SPAB

On August 28, President Roosevelt entered into controversies between the Office of Production Management and the Office of Price Administration and Civilian Supply, and announced the creation of a new armament agency to be known as the Supply Priorities and Allocations Board (SPAB). This board will have authority to fix allocations and priorities, and it assumes a position of importance because it will control resources. No manufacturer can operate without the raw materials, fuel and power facilities under the board's jurisdiction. Even the OPM, it is said, will be dependent upon the SPAB to that extent.

Vice President Wallace is chairman of the new board and Donald Nelson, of Chicago, is executive director and will act for Mr. Wallace in his absence. Mr. Nelson also is made director of priorities in the OPM.

In addition to Vice President Wallace and Donald Nelson, the committee members are: Leon Henderson, Harry L. Hopkins, Secretary of the Navy Frank Knox, Harry L. Stimson, William S. Knudsen, and Sidney Hillman.

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PAPER INDUSTRIES METALS COMMITTEE

A committee has just been formed to be known as the Paper Industries Metals Committee. This committee composed of representatives of manufacturers of pulp and paper mill machinery and equipment will co-operate with the OPM in an effort to obtain preference rating for materials and equipment essential for the manufacture of pulp and paper. Announcement of the formation of this committee states that the committee has the full co-operation of D. C. Everest, consultant in the Pulp and Paper Unit of the OPM, and Charles W. Boyce assistant consultant, as well as E. W. Tinker, executive secretary of the American Paper and Pulp Association.

The committee is composed of the following:

Walter L. Barker, president, Improved Paper Machinery Corp., Nashua, N. H.

A. B. Clark, president, J. O. Ross Engineering Corp., New York City.

W. W. Cronkhite, manager of sales, Industries Manufacturers Section, General Electric Co., Schenectady, N. Y.

Frank R. Henry, vice president, Simonds Worden White Co., Dayton, Ohio.

Ralph S. Johnston, director of sales, The Pusey & Jones Corp., Wilmington, Del.

S. Harley Jones, vice president, E. D. Jones & Sons Co., Pittsfield, Mass.

Herman L. Kutter, president, The Black-Clawson Co., Hamilton, Ohio.

L. J. List, president, Samuel M. Langston Co., Camden, N. J.

Homer D. Martindale, vice president, The Shartle Brothers Machine Co., Middletown, Ohio.

Elbert H. Neese, president, Beloit Iron Works, Beloit, Wis.

Wm. B. Wilshusen, president, Bird Machine Co., South Walpole, Mass., Chairman.

John Cornell, *Paper Mill News*, New York City, Secretary.

According to Mr. Everest, the committee's first move to secure a preference rating, is to compile information concerning the quantity of metals used by the companies supplying equipment to pulp and paper mills. The newly formed committee is now compiling this information for submission to the OPM.

(Release date, August 26)

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McCABE TAKES YEAR'S LEAVE FROM SCOTT CO.

E. R. Stettinius, Jr., Director of Priorities, announced on August 18, the appointment of Thomas B. McCabe, president of the Scott Paper Company, Chester, Pennsylvania, as Deputy Director of the Division of Priorities in charge of operations.

Mr. McCabe, who has served with Mr. Stettinius during the past year in the Industrial Materials Division of the National Defense Advisory Commission, will take the place of James L. O'Neill, who is returning to his duties as operating vice president of the Guaranty Trust Company, New York.

Upon taking up his new duties in Washington, Mr. McCabe is securing a leave of absence from his official position as president of the Scott Paper Company and directorship on its board, as well as its subsidiaries, but is continuing as chairman of the board of directors of the Federal Reserve Bank, Philadelphia.

In order to devote his major efforts to government service in this emergency, Mr. McCabe has resigned as a director of the American Viscose Corporation and the Air Reduction Company, Inc. He has also relinquished the chairmanship of the following committees: Committee on Economy Policy of the National Association of Manufacturers; the Delaware County Committee of the Pennsylvania Economic League; and the Committee for the Co-ordination of the Defense Contracts in Delaware and Chester counties in Pennsylvania.

During Mr. McCabe's absence from the Scott Paper Company, the executive operations of the business will be carried on under the guidance of an Executive Committee composed of First Vice President William F. Mohan as chairman; Vice President W. S. Campbell, vice chairman; Treasurer G. Willing Pepper, secretary; Controller W. M. Carney, who will be alternate and serve in Mr. Pepper's absence.

Born in Whaleyville, Maryland, July 11, 1893, Mr. McCabe graduated from Swarthmore College in 1915, of which institution he is now a member of the Board of Managers. In 1916 he became associated with the Scott Paper Company as a salesman.

Thomas B. McCabe

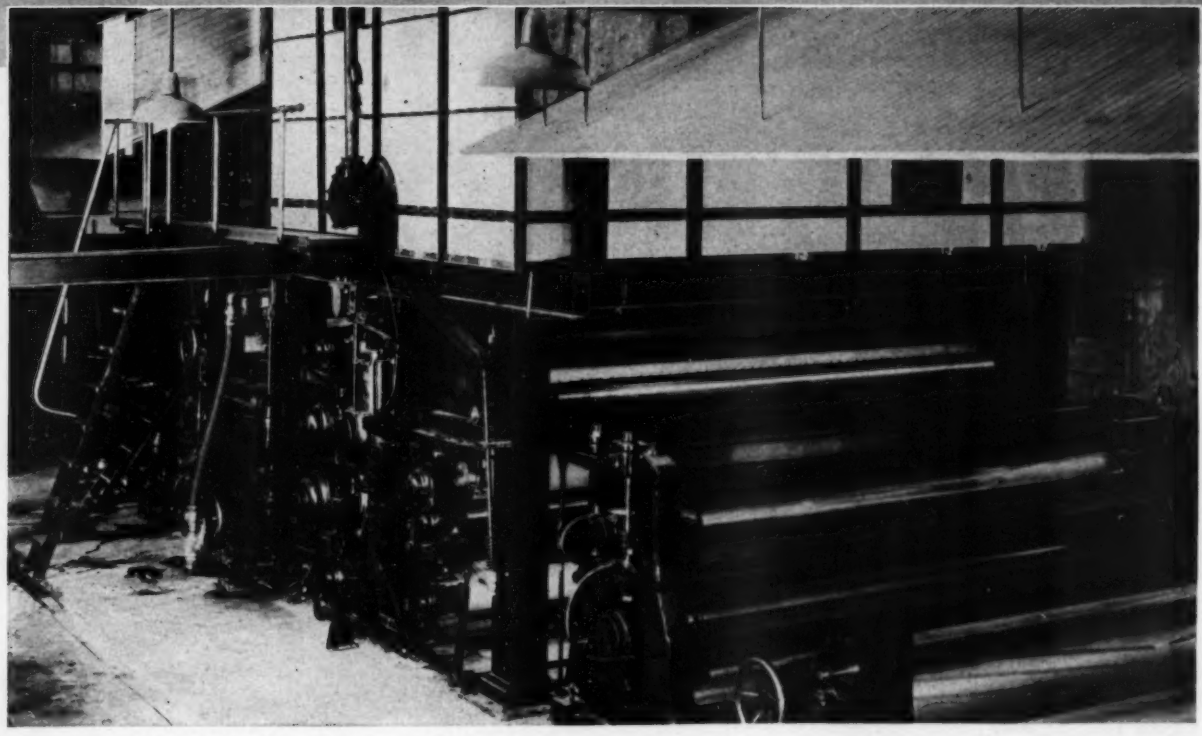
Mr. McCabe was made assistant sales manager in 1919, sales manager in 1920, became a director in 1921, and was appointed vice president of the company in 1927. During the same year he became president of the organization.

During the World War, he enlisted as a private and was a captain when he left the service in 1919.

Mr. McCabe is familiar with official Washington because of his association last year with Mr. Stettinius, his Federal Reserve activities and his membership on the Business Advisory Council for the Department of Commerce. As Deputy of the Priorities Division, he will have charge of all operating and procedural problems.

(Release date, August 18)

Latest improvements on new machine for making facial tissue



This new 138" Puseyjones Fourdrinier for the making of facial tissue, reflects the experience of nearly 75 years in producing paper-making machinery. It is equipped with these outstanding Puseyjones features:

(1) Copper-lined Head Box with flow distributor;
(2) High-speed Slice insuring proper formation;
(3) Compact press and dryer arrangement;
(4) Pneumatic control on pressure roll nip;
(5) Creping dryer, special material and construction;
(6) Doctor of special design for dry creping.

The performance of this new 138" Fourdrinier in the mill of a leading maker of toilet and facial tissue—fine quality tissue at top running speeds—is typical of the results being achieved with high-speed Puseyjones machines in manufacturing papers of almost every type. Write for further facts.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-making Machinery. Wilmington, Del.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

GROUP MEETINGS STUDY

Chlorine Reduction

▸▸▸ EXPECTATIONS that a detailed program for reduction of chlorine consumption by manufacturers of various types of paper would be ready for presentation to the Office of Production Management about the middle of September were revealed in New York City August 27.

Such a program is being worked out by trade groups in response to an OPM request that the industry as a whole cut its chlorine use by 40 per cent from the current figure. This request was made after the industry had voluntarily effected a 10 per cent reduction about two months ago. It was reported that OPM fears a drastic shortage of chlorine by the turn of the year, despite construction of new production facilities.

After one of a series of technical group meetings held August 27 at the Hotel Waldorf-Astoria by the sulphite bond group of the Writing Paper Manufacturers Association, M. C. Dobrow, secretary, said various methods were studied by which it would be possible to maintain existing paper production schedules while acceding to the OPM request for reduced use of chlorine. The effect would be to make paper generally less bright white, it was stated, but the program should not seriously interfere with the utilitarian value of the paper.

The writing paper group also considered a proposal for simplification and standardization of stock lines, which would have the effect of increasing production and conserving raw materials. Fewer sizes and colors were suggested, as well as the elimination of fancies and novelties.

Indications were that the writing paper group may propose a program for a reduction in chlorine use of considerably less than 40 per cent for writing paper, while cuts of more than 40 per cent may be sought in some other types of paper.

Writing paper demand has expanded sharply, both as a direct result of the defense program and as a result of increasing civilian business, it was noted. Mr. Dobrow reported that writing paper shipments in the first seven months of the current year ran 17 per cent ahead of the comparable 1940 period, and he predicted that the total for the year will be 20 to 22 per cent ahead of 1940. This compares with a rise for all grades of paper, except newsprint and paperboard, of 13.5 per cent in the first half of the year.

It is emphasized by both writing paper men and representatives of other producing groups that there is no suggestion that paper production should be reduced. On the contrary, it was said, OPM desires to increase total output. While conservation of chlorine is desired because of munitions needs, it was pointed out that there is no present acute shortage. The OPM request was said to represent an effort to avert a shortage rather than an attempt to correct a shortage already in existence.

Recent reports that the paper industry was to be asked to cut its production were said to have led to increases in inquiries from various customers who were seeking to accumulate supplies against what they believed to be an impending production cut. Most mills are unable to increase their bookings appreciably, since their near-by production capacity is well sold. In any case, it was stated, mill men have sought to discourage "hoarding" of supplies by consuming groups.

◆

CONSOLIDATED TO BUILD DAM FOR POWER SITE

Power to operate paper mills in the Wisconsin River Valley will be generated a year from now at a new $1,500,000 hydroelectric development started September 1 near Knowlton, 12 miles north of Stevens Point.

A dam and dike one and one-third miles long creating a 7,200-acre lake are being constructed by the Consolidated Water Power and Paper Company, which operates mills at Wisconsin Rapids, Stevens Point, and Biron. The dam itself will be 440 feet long. It will have 11 gates, each 30 feet high and 18 feet wide. Relocation and elevation of U. S. Highway 51 for two miles and construction of two bridges with total spans of 275 feet will be necessary and the Marathon County Highway Department has started laying out and improving roads to be used as detours during the construction.

The Battle Island power site will have a generating capacity of 43,000,000 kw-hrs. of electricity annually, or 10,500 hp., and arrangements have been made to tie the power into the lines of the Wisconsin Public Service Corporation.

Construction work will be directed by the Consolidated Engineering Department but sub-contracts will be let, according to Tom Utegaard, company engineer. The George W. Condon Company of Omaha, Nebraska, has the contract for building the earth-filled dike of 345,000 cubic yards. Another 65,000 cubic yards of earth will be moved by highway crews for the road elevation, which will reach a maximum of 14½ feet.

Orders for material and equipment for the project already have been placed, according to George W. Mead, president of Consolidated.

Company officials hope there will be a minimum of difficulty obtaining delivery of structural steel and other materials. Because the new power will be available for companies engaged in defense activities, Consolidated officials hope to be granted material priorities. Barring delays, power generated at the Battle Island site will be available by September, 1942.

A total of 300 men will be employed from now until March, 1942, clearing land, building dikes, a power house and high tension lines. Another large crew will work on the Highway 51 relocation. When completed, the relocated portion of the highway will become the east bank of the large lake formed by the power development. Company officials stated all trees will be removed from the flooded area and the lake will present an attractive appearance, suitable for camps and cottage sites and for boating and bathing.

Cost of relocating Highway 51 is being shared by the company and the State, as the State for years has contemplated relocating this part of the highway which frequently is flooded during spring break-ups.

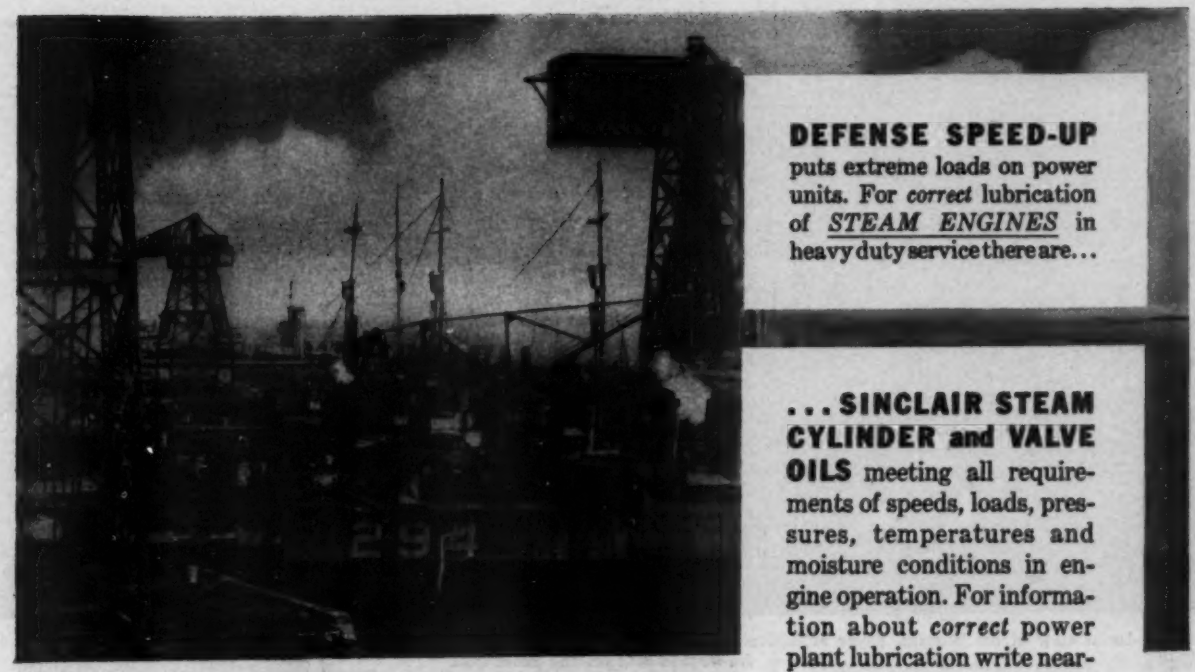
The job was planned by William F. Thiele, chief engineer, and by Mr. Utegaard, and M. V. Molesberry, also company engineers. Land acquisition has been going on for a period of years. Construction superintendent on the job will be George Marcoux of the Consolidated.

◆

MASONITE PLANS NEW STOCK ISSUE

A registration statement covering a proposed issue of 35,000 shares of 4½ per cent cumulative preferred stock at a par value of $100 was recently filed with the Securities and Exchange Commission in Washington by the Masonite Corporation, Chicago.

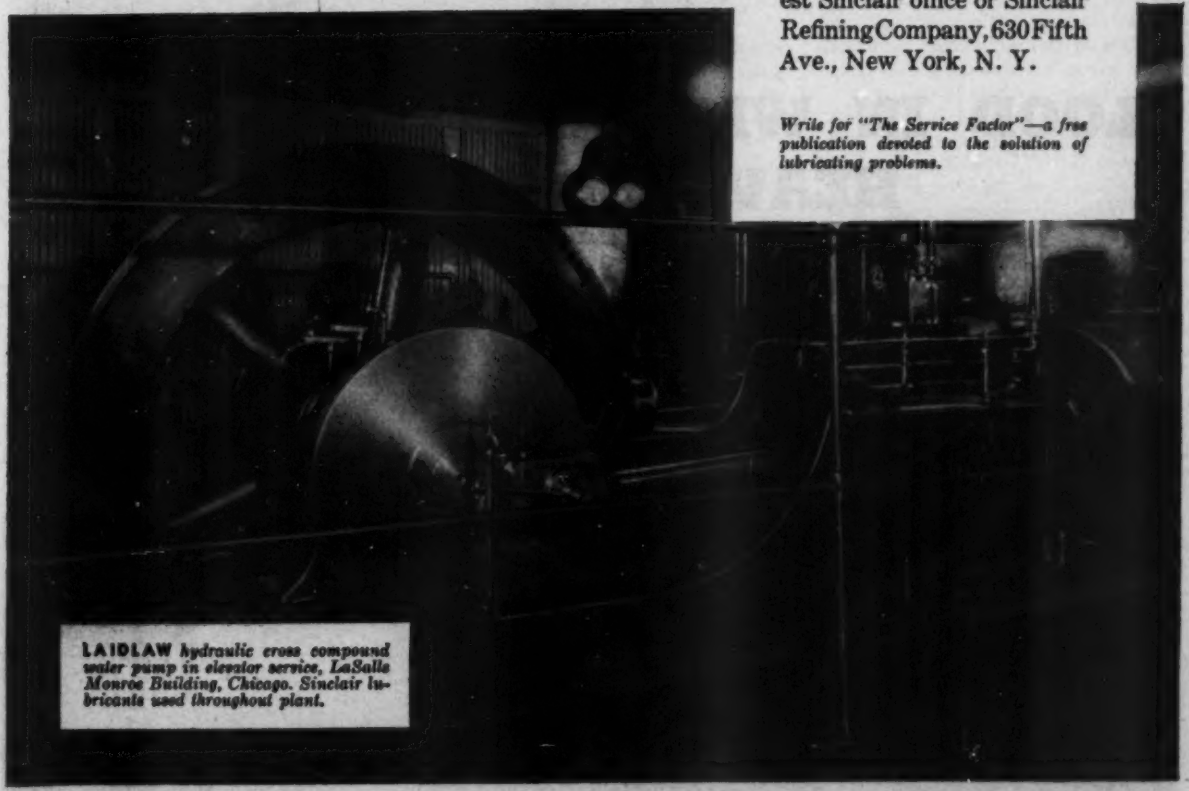
The proceeds of this issue will be used to buy up the outstanding shares of 5 per cent cumulative preferred stock and to carry out an extensive improvement program, which is already under way, to increase the production at its Laurel, Mississippi, plant. The remainder will be added to the company's working capital.



DEFENSE SPEED-UP puts extreme loads on power units. For *correct* lubrication of *STEAM ENGINES* in heavy duty service there are...

...SINCLAIR STEAM CYLINDER and VALVE OILS meeting all requirements of speeds, loads, pressures, temperatures and moisture conditions in engine operation. For information about *correct* power plant lubrication write nearest Sinclair office or Sinclair Refining Company, 630 Fifth Ave., New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



LAIDLAW *hydraulic cross compound water pump in elevator service, LaSalle Monroe Building, Chicago. Sinclair lubricants used throughout plant.*

SINCLAIR INDUSTRIAL OILS

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • 1907 Grand Avenue, Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

Left—Aerial view of the Wausau Paper Mills Company plant at Brokaw, Wisconsin. Right—View of the south side of the mill showing the washed out Finishing Room wall.

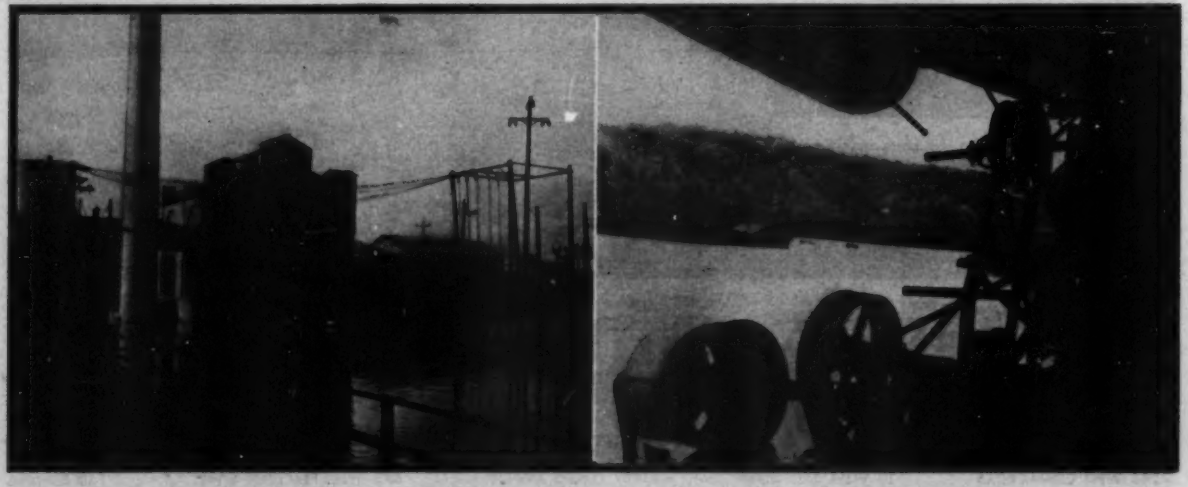
FLOOD IN WISCONSIN CAUSES HEAVY DAMAGE TO MILLS

▸▸▸ AS A RESULT OF torrential rains from Friday afternoon, August 29 to Saturday night, August 30, and the failure of two dams in the Wisconsin River Valley, the greatest flood in the Wausau district in nearly 30 years caused over half a million dollars damage.

The Spirit Falls reservoir near Tomahawk, which was comparatively dry, filled up close to its 500,000,000 cubic foot capacity. When its two gates were unable to provide sufficient spillway, the huge mass of water tore out about 400 feet of embankment and started south.

At Brokaw, the Wausau Paper Mills Company's earthern dyke, 75 feet long, stretching from the mill to the wooden dam, went out, undermining the generator room and machine room walls. Part of a settling tank, close to 500 tons of paper, and a mill cutter slipped into the stream through the openings in the walls broken out by the flood.

With the machine room floor sloping precipitously toward the river, it seemed that nothing could stop one of the paper machines from sliding into the flood. Fortunately the water pres-



Left—View in the mill yard at the Brokaw plant. Right—Another view showing the Finishing Room wall out.

Left—Aerial view of the Marathon Paper Mills Company plant at Rothschild, Wisconsin. Note dangerous accumulation of logs in front of dam. Right—Another view taken just south of Rothschild. Normal river bed is shown in top of picture.

sure slackened sufficiently to prevent additional loss.

Carl Magnus, mill manager, and Emil Damp, paper mill boss, narrowly escaped death while standing on the roof of the generator room, watching the water. A loud, crackling noise warned them of impending danger. A few seconds after they ran to safety, the section on which they had been standing slid into the flood.

At the time this article was written, no information could be obtained from mill officials as to the probability of the mill being rebuilt and again operated. Company directors were to meet on September 5 to discuss the situation.

At Merrill, the Ward Paper Company escaped serious damage by the prompt action on the part of its employees. A tractor was called into service to pull refuse, carried by the swollen Prairie River, from the face of the dam. This prevented blockage of the flow of water through the dam and reduced pressure. Sandbagging of the dam and shore prevented some of the passage of excess water into the mill, although some water seeped into the basement, damaging some electrical equipment.

The Marathon Paper Mills Company at Rothschild also escaped serious damage only through prompt action on the part of management, employees and friends of the company. Some work was done during the afternoon and early evening of Sunday, August 31, in preparation for the high water. At approximately 11:00 o'clock Sunday night a request was sent out to all employees through the theatres, various meeting places, and by messengers to report at once. To the anticipated excess flowage of water from the Wisconsin River had been added flood waters from the Rib River at Wausau and the Eau Claire River at Scholfield. Employees worked throughout Sunday night and until Monday afternoon cleaning away debris from the dam, moving paper and equipment to higher locations and building up the retaining walls adjacent to the river.

The head water reached to within a few inches of the top of the dam during the early hours of Monday morning despite the fact that all dam gates had been opened hours before. The tail water rose above the window openings in the power house which had been previously blocked by planking and packing. The tail water rose above the level of the retaining wall also, and complete undulation of almost all of the lower floors of the mill was prevented only by the sandbagging done by employees during the night. Some water managed to reach mill property by undermining the retaining wall or by coming in from property adjoining the mill from the south, where the river had overflowed its banks. This flowage damaged electrical equipment and resulted in a few days shutdown, but the mill is again in complete operation.

Left—Unloading sandbags during Sunday night at Rothschild. Center—Finishing Room at Marathon. Right—Raised gates—note those out of line. (Photographs courtesy Record Herald Company)

Thirtieth annual conference of Hammermill agents was attended by delegates from all sections of the U. S., China and Java.

HAMMERMILL'S 30TH ANNUAL CONFERENCE

More than 130 paper merchants from all sections of the United States, from Java and China, attended the thirtieth annual conference of Hammermill agents at Erie, Pennsylvania, August 20-22. This conference has become a very important gathering for all those connected with the Hammermill Paper Company's organization, but this year more important topics were up for discussion than have come before this body in its thirty years. The important theme of the meeting, of course, was the effect of the national defense emergency on the paper industry and the Hammermill company's efforts to meet present demands with high-quality products.

Business sessions of the conference were held the mornings of the 21st and 22nd at the Kahkwa Club, with Norman W. Wilson, Hammermill president, presiding. Highlighting these sessions were talks by Bruce Barton, nationally known advertising man, author, and former congressman; Donald S. Leslie, Hammermill's first vice president and assistant general manager; and Harrison R. Baldwin, vice president in charge of sales.

Bruce Barton gave an analysis of the international situation and the events which led to the present European conflict. He also gave a graphic picture of the problems that face America in this emergency, and he expressed strong confidence that the United States would come out of the controversy a leader and the strongest and best defended country in the world.

Mr. Leslie gave a brief summary of what is going on in the industry today and what Hammermill is doing to meet the heavy demand during the emergency. He outlined all of the modernization and improvements that have been put into work during the coming year by the Hammermill company which has increased its productive capacity.

Mr. Baldwin's address on the sales activities of Hammermill during the coming year was supplemented by charts tracing trends in the sales of the company's lines. He presented sales achievement certificates to top-ranking Hammermill agents.

Another headline address was given by A. Ellis Frampton, Hammermill's advertising manager and assistant general sales manager. He outlined the advertising program for the coming year and showed how it will support the company's agents in the future. J. Fred Wuenschel, the company's district sales manager for the Pacific Coast, reported on activities at the Grays Harbor Pulp and Paper Company, Hoquiam, Washington, and reviewed the production records that are being established at this mill.

There were special mill inspection trips, during which the agents inspected new equipment; the Agent's Advisory Committee was entertained at Weigelia Lodge, the country home of President Norman W. Wilson; and there was plenty of entertainment afforded the golf players. The E. R. Behrend Golf Trophy, presented annually to the agent with the lowest net score during the Thursday afternoon game, was won this year by Frank W. Holden of The Rourke-Eno Paper Company, Hartford, Connecticut. There were the usual other golf prizes awarded for the games on both Thursday and Friday.

FINANCIAL

The developments abroad, though with some depressing effect on the stock markets, produced few changes in the prices of paper mill securities, which remained relatively stable and firm as compared with earlier months of the year. The tax bill of the defense effort is making itself felt in the reports of paper mill earnings. International's tax bill for the first six months, for example, is over $9,000,000 or 150 per cent of the company's net earnings, after deduction of this sum. Crown Zellerbach's tax bill for the year is over $7,000,000 and the same condition is true in a lesser degree with all the mills.

American Writing Paper Corporation—Net profit for the first half of 1941 was $136,778 as against $31,504 for the same period in 1940.

A. P. W. Paper Company—Net profit for the first half year was $95,734 as against $31,504 for the first half of 1940.

Certain-teed Products Corporation—Net profit for the first half year was $518,721 as against $168,581 in the 1940 period.

Container Corporation of America—Net earnings for the six months ending June 30 were $1,160,691 as compared with $939,761 for the similar period in 1940.

Crown Zellerbach Corporation—Net profit for the fiscal year ending April 30 was $8,866,276 as against $6,119,494 for the previous year. The company's tax bill for the year was $7,000,000, an increase of 100 per cent over the previous year.

Crystal Tissue Company—Net profit for the first half year was $56,216 as against $76,767 for the same period in 1940.

Gaylord Container Corporation—Net profit for the first half year was $606,037 as compared with $643,669 for the same period in 1940.

Great Northern Paper Company—Net profit for six months to June 30

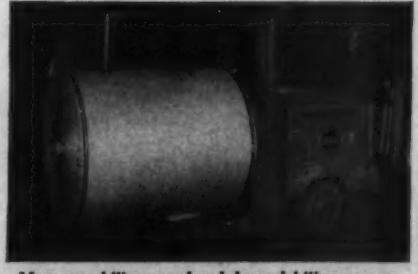
22 BAKER TRUCKS serve the 6 plants of WEST VIRGINIA PULP AND PAPER COMPANY

Three Baker Hy-Lift Trucks loading heavy rolls of paper into box cars at Westvaco's Charleston, S. C. mill.

The name "Westvaco" is recognized as a symbol of quality wherever paper is sold, and West Virginia Pulp and Paper Company is known everywhere for its alert business policies. Those who know the company's mills are equally impressed with their modern, efficient production methods ... Baker points with pride to the 22 Baker Trucks which serve Westvaco — saving time and money by providing faster handling, increased production, more effective use of storage space.

Let us show how Baker Trucks can cut handling costs in your plant.

Tiering rolls inside box cars is no difficult task for this Baker Hy-Lift Truck.



Maneuverability, speed and dependability are outstanding features of Baker Trucks. Model shown has capacity of 6000 lbs.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2169 WEST 25th STREET • • • CLEVELAND, OHIO
In Canada: Railway & Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

was $1,288,485 as compared with $1,426,155 in the 1940 period.

Hinde and Dauch Paper Company—Net profit for six months ending June 30 was $525,500 as against $462,319 for the same period in 1940.

International Paper and Power Company—A meeting of the stockholders will be held September 25 to authorize a simplification of the capital structure, by which the old International Paper Company, a holding company, and International Paper and Power Company will be unified as the International Paper Company. (See Trade Winds.)

Keyes Fibre Company—Net profit for the first half of 1941 was $143,749 as against $120,246 for the same period in 1940.

Kimberly-Clark Corporation—Net profit for the quarter ending June 30 was $840,715 as against $516,105 for the same period in 1940. Net profit for the year ending June 30 was $2,311,939 as against $2,889,315 for the preceding fiscal year.

Mac-Sim-Bar Paper Company—Net profit for the first half year was $74,734 as against $44,396 for the same period in 1940.

Masonite Corporation—A new issue of 4½ per cent preferred, totaling 35,000 shares, has been offered to the public to replace 18,419 outstanding shares of 5 per cent stock, and to permit plant improvements.

Oswego Falls Corporation—Net profit for the six months ending June 30 was $461,120 as against $303,646 for the same period in 1940.

Puget Sound Pulp and Timber Company—Net profit for the first half year was $578,305 as against $433,433 for the same period in 1940.

Rayonier, Incorporated—Net income for the three months ending July 31 was $834,983 compared with $1,085,552 for the same period in 1940. Taxes, however, increased $279,797 as compared with 1940, so the net income was smaller than a year ago, though gross income was $29,000 larger.

Scott Paper Company—Net profits for six months ending July 5 were $835,609 as against $752,805 for the same period in 1940.

Soundview Pulp Company—Net profit for six months ending June 30 was $967,473 as against $1,161,223 for the same period in 1940.

Southern Advance Bag and Paper Company—Net profit for the first half year was $251,656 as against $315,338 for the same period in 1940.

Sutherland Paper Company—Profit for the first half year was 609,582 before deduction of income taxes, an increase in gross of $56,000. After deduction of taxes, net profit is $426,707 as against $437,525 for the same period in 1940.

Union Bag and Paper Corporation—For the year ending June 30, net profits were $1,904,502 as against $1,847,872 for the previous year. Tax provisions for the second quarter of 1941 alone were $731,633.

S. D. Warren Company—Net profits for the six months ending June 30 were $248,220 as compared with $199,454 for the same period in 1940.

New York Stock Exchange—Stocks

	Closing Prices August 25	July 25
A. P. W. Paper Co.	*1⅜-1½	*1-1¼
Celotex	8¾	9¼
Same Preferred	67⅝	*67¾-69¾
Certain-Teed	3¾	3⅜
Same Preferred	31	*32⅞-33⅞
Champion P. & F. Co.	21½	21¼
Same Preferred	104¾	103½
Container Corp.	15	16
Cont. Diamond	9¼	9
Crown Zellerbach	13⅞	14½
Same Preferred	87¾	*86½-87½
Dixie-Vortex	8⅝	*8-9
Same "A"	36	35
Robert Gair	2⅛	2⅛
Same Preferred	10⅛	10⅜
Gaylord Container	11¼	*11¾-11⅞
Same Preferred	*50⅛-51⅛	*50-52
Internat'nal P.&P. Co.	18½	17¾
Same Preferred	69	67
MacAndrews & Forbes	*25½-26	25⅞
Masonite	24	*24-24½
Mead Corp.	9	8⅞
Same Preferred	79¼	*79¼-83
Paraffine Co.	31	*30½-30⅞
Same Preferred	*100-105	*101-102
Rayonier	15½	15⅛
Same Preferred	29	*28⅛-28¾
Scott Paper	37¼	36
Same 4½% Pfd.	113	112⅝
Same 4% Preferred	110⅜	*110¼-111½
Sutherland Paper	20⅛	22
Union Bag & Paper	11	11⅞
U. S. Gypsum	58¾	61
Same Preferred	178½	175½

New York Stock Exchange—Bonds

Abitibi 5%	55⅞	.....
Celotex 4½%	96¾	.....
Certain-Teed 5½%	86¼	87½
Champion P. & F. Co. 5%	107	.....
Inter. P. & P. Co. 5%	104⅜	.....
Same 6%	105¼	105

New York Curb Exchange—Stocks

Am. Boxboard	*5⅛-5½	*5⅛-6⅛
Brown Co. Preferred	22	*19-19½
Great Northern	39½	*37¼-38
Hummel-Ross	6¼	*5⅜-6⅛
Nat. Container	10⅜	*12⅛-12⅜
St. Regis	2⅜	2⅛
Taggart	2⅜	3⅛
United Wall Paper	1¼	1¼

*Closing Bid and Asked Prices.

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▶▶▶ ALL GRADES OF PULP have now been placed under export control, whereas formerly only certain grades were subject to restriction.

ECUSTA EXPANSION NEAR COMPLETION

About a year ago, a $2,000,000 expansion program went into work at the plant of Ecusta Paper Corporation, Pisgah Forest, near Brevard, S. C. This new plant began operations in August, 1939, and made its first shipment of cigarette paper about the time the war broke out in Europe. The supply of imported cigarette paper has been cut off since that time, which has augmented the demand for domestic cigarette paper.

The expansion program, now almost completed, includes additions to the power plant and two reservoirs with a capacity of 3,000,000 gallons. It is claimed these reservoirs are unique—something entirely different in engineering, and said to be the only ones of the kind in this country. They are known as surface reservoirs, most of them being beneath the surface of the ground. The dome is only two inches thick—it is applied by a special process.

Near these reservoirs is a 500,000-gal. steel tank. This tank is twice the size of the tank erected at the plant when it was built. There is also an addition to the filter plant.

The first unit of the expansion program to be completed and already in use is the fine cafeteria which was opened to the employees officially the second week of August. This addition cost $60,000 and has a seating capacity of 300.

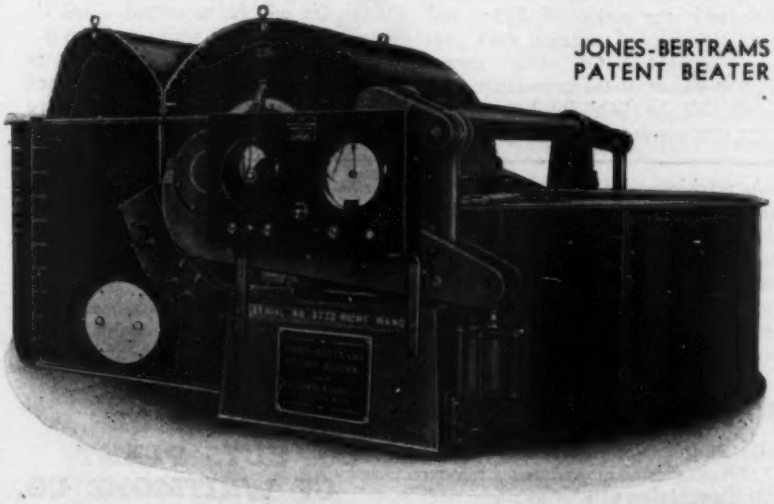
◆

MASONITE STARTS NEW POWER PLANT —ASKS NEW STOCK

The new $800,000 electric power station at the Laurel, Mississippi, plant of the Masonite Corporation, was put into operation on August 25. The new station is the gas-fired, steam turbine type, and is complete and modern in every detail, capable of generating 14,000 kw. Enough power will be generated from this new plant to serve all the needs of the Masonite plant, with 3,500 kw. left over, which will be used to alleviate the present shortage in the Southeast.

The installation of the power plant is only part of an extensive program to be carried out by this company. The financing of this large expansion program is mentioned in a news release concerning the application to the Securities and Exchange Commission for a proposed issue of 35,000 shares of 4½ per cent cumulative preferred stock at a par value of $100. The proceeds from this issue will also be used to buy up the outstanding shares of 5 per cent cumulative preferred stock and to increase the company's working capital.

You cannot continually coast along with costly beater room operation. Nor can you insure customer satisfaction and maximum economy with antiquated beaters. For competition after '41 may prove keener. Quality and price of paper may mean a real fight for business. For these vital reasons, many paper makers are looking ahead . . . several already have placed orders for 1942 delivery of JONES-BERTRAMS PATENT BEATERS to get uniformity of product . . . improved quality . . . greatly increased production . . . lower HP per ton . . . and to get the advantage of more efficient use of floor space. A 64-page booklet "A Study of the Beater" gives the facts. Yours upon request.



JONES-BERTRAMS
PATENT BEATER

Jones

E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of Quality Machinery for Paper Mills

"INTERNATIONAL" COMPANIES' CORPORATE STRUCTURE WILL BE REORGANIZED

▶▶▶ CONTINGENT UPON the vote of stockholders at a special meeting to be held September 25, the corporate structure of existing "International" companies will be reorganized. This new program calls for the elimination of International Paper and Power Company, the present holding company, and the distribution to each shareholder and warrant holder of corresponding shares and warrants of a New York corporation which will take the name "International Paper Company." The present International Paper Company would be consolidated into a new corporation.

It is unnecessary to continue the existence of both the International Paper and Power Company and the International Paper Company, as all the hydroelectric power investments, with a few small exceptions, have been disposed of. When the suggested program is completed, the shareholders of the International Paper and Power Company, which is solely a holding company, will own stock in the new International Paper Company. All the assets and properties now controlled by the International Paper and Power Company would be transferred to the books of the new company.

The new program will achieve two results: (1) it will bring about a simplification in the corporate structure; and (2) it will cut down administration expenses and taxes. The change will not affect the interests of any shareholder or warrant holder.

Two distinct steps are involved in the new plan to be submitted to the shareholders: First—(a) the transfer of the assets of International Paper and Power Company to the New York corporation, which will eventually become the International Paper Company; (b) the termination of the International Paper and Power Company; and (c) the distribution to its shareholders and warrant holders their shares and warrants in the new corporation. Second—the consolidation of the present International Paper Company into the new corporation. By this act of consolidation, the new corporation will assume the liabilities and acquire the assets of the present International Paper Company.

The authorized capitalization of the new company will be: 1,000,000 shares of cumulative convertible 5 per cent preferred stock with par value of $100; 6,000,000 shares of common stock with par value of $15; and 1,348,218 units of common stock purchase warrants. Of these issues, 925,978 shares of the cumulative preferred will be held by the public; 1,823,879 shares of the common stock will be released to the public, and 1,347,748 units of the warrants.

According to the Commissioner of Internal Revenue, the steps necessary for the carrying out of the new program will bring about no taxable gain or deductible loss to either of the constituent corporations. If Congress should change any of the tax statutes and make the changes retroactive so as to cover past transactions, this organization could postpone putting the new program completely into effect either by directors withholding final action or by adjournment of the shareholders' meeting.

The new International Paper Company will apply to the New York Stock Exchange for listings of 5 per cent preferred and common stock and to the New York Curb Exchange for listing its common stock purchase warrants. These listings are expected to be completed so that trading can begin immediately after the termination of the International Paper and Power Company.

Although meetings before which this plan will be submitted—both the shareholders and warrant holders—will be held September 25 and 24 respectively, the record dates of these meetings are: shareholders August 18, and warrant holders August 16.

RHINELANDER CO. NAMES MACHINE THE "BIG SWEDE"

Named the "Big Swede," the new paper-making machine now being installed in the large fireproof addition of the Rhinelander Paper Company, Rhinelander, Wisconsin, is the largest machine of its kind in the middle west, company officials state.

Given its name by N. F. Becker, president of the company, the new machine was built by the Beloit Iron Works, Beloit, Wisconsin. Although the practice of naming a machine is common in Scandinavian countries, it is not often done in America. The Rhinelander company's new machine will have a name plate to formally designate the "Big Swede."

The machine will be 266 feet from the center line of the breast roll to the center line of the winders. Seventy-one dryers, 36 inches in diameter, and five presses (with bottom rolls 28 inches in diameter and top rolls 26 inches in diameter) will make this an outstanding piece of equipment.

A machine with five presses is a rarity in the paper-making field. The added dryness to be gained is an advantage in the production of glassine and greaseproof papers, which are principal products of this mill. So far as is known, this will be the first machine in the middle west with five presses.

The suction couch roll will be 42 inches in diameter and the slice width is 177 inches. The bottom calender roll is 28 inches in diameter and weighs 37,000 pounds. The wire has a removable fourdrinier with a stainless steel frame. The wire will be 182 inches wide and 100 feet long.

When put into operation, about December 1, the "Big Swede" will be housed in a modern new building adjacent to the main plant. This machine room will be 103 by 365 feet overall, and it will include such modern features as glass brick windows and a traveling crane with a 70-foot span and a hoisting capacity of 20 tons.

The new addition was designed so that two machines may be housed in it ultimately.

A new beater room, 63 by 95 feet, is being added to the plant, and other work is being done to take care of the increased production which will result from installation of the new paper-making machine.

Total cost of the work is expected to be about one and a quarter million dollars.

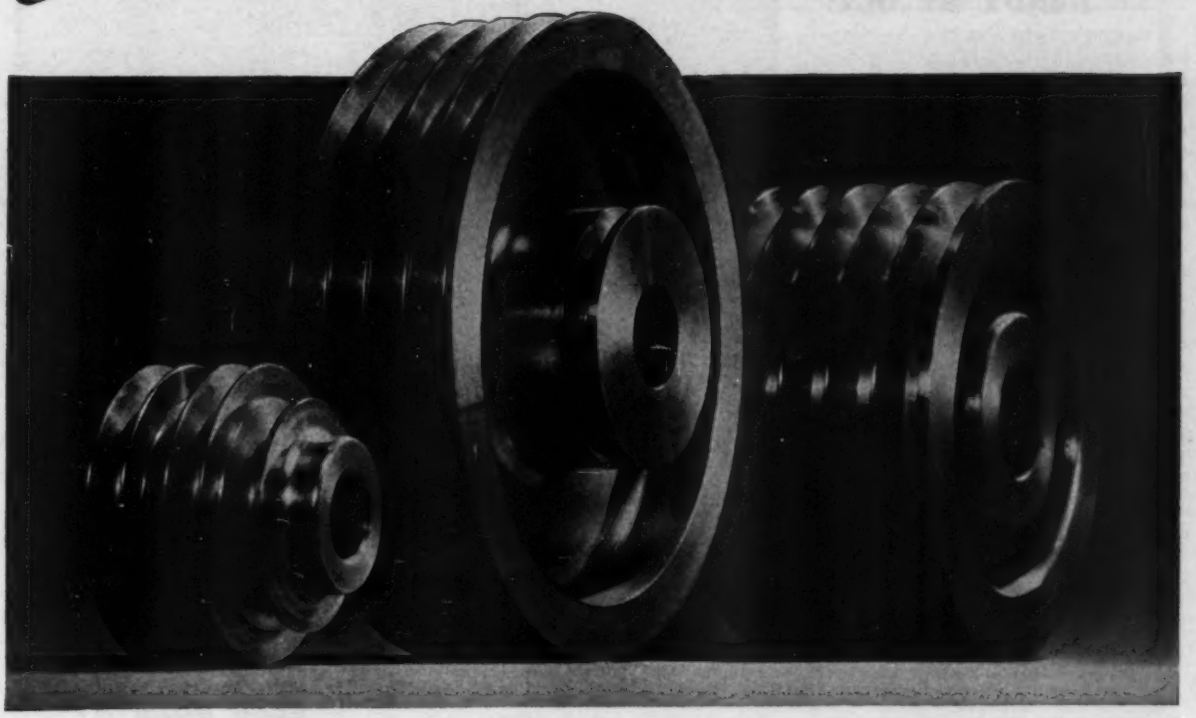
◆

MENASHA PRODS. CO. BUYS PLANT OF WHITMORE CO.

In order to provide more property for possible expansion, the Menasha Products Company Division of Marathon Paper Mills Company, Menasha, Wisconsin, recently purchased the Whitmore Machine and Foundry Company, located adjacent to its plant in Menasha. Part of the building will be rented to the Menasha Printing Ink Company, a subsidiary of the Marathon Company.

The Whitmore Company which was founded in 1919, will continue to operate under the same management with Guy Waldo as manager.

Invitation to Profitable H.P.



Wood's

V—BELT SHEAVES AND DRIVES

Meticulously engineered, Wood's V-Belt Drives "pay off" every hour they operate . . . return cash dividends in power savings made possible by their peak efficiencies.

Only sheave grooves that are precision machined, accurately spaced and absolutely true, with side walls at perfectly uniform angles can make possible such invariably long-lived, economical performance.

Our stock assortment consists of 2800 drives, from 1/4 H.P. to 100 H.P., with at least a dozen selections of center distances for each drive.

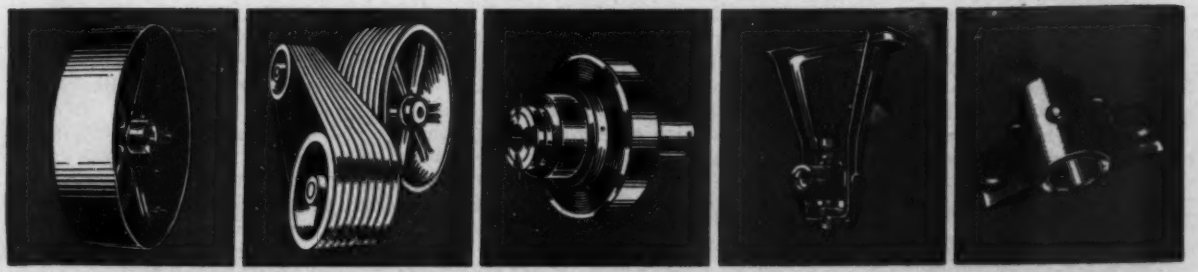
SPECIAL RUSH DELIVERY SERVICE on emergency jobs—shipment of stock drives same day order received.

T. B. Wood's SONS COMPANY

CHAMBERSBURG, PENNA.

EVERYTHING IN TRANSMISSION

Bearings — Collars — Clutches — Couplings — Contactors — Hangers
Pillow Blocks — Pulleys — V-Belt Sheaves and Complete Drives



NEW BUILDING AT PEJEPSCOT READY BY OCT.

Construction on the new building, being built by the Pejepscot Paper Company at its Pejepscot, Maine, plant, is nearing completion and when finished will be used to provide additional space for finishing operations and storage. It is expected that the company will occupy the new plant about October 20.

The new building is located beside the machine room, and is about half as large as the main building. The No. 1 paper machine will be moved from the Bowdoin Division to Pejepscot and the use of the smaller machine at Bowdoin will be discontinued. This new plan is expected to restrict the lines of paper produced by the plant, but the tonnage will remain approximately the same. The operating costs are expected to be substantially reduced under the new set-up.

The new building will be used for finishing and storage, and will allow the company to increase its stock of sheet papers. All the conversion and sheeting equipment now at Pejepscot will be moved to the Bowdoin Division so that there will be ample space at Pejepscot to carry out the new plan.

◆

A NEW METHOD FOR RESTORING CHARRED PAPERS

From England, where indiscriminate incendiary bombings have caused havoc to buildings with consequent injury of valuable records, comes word of a new glycerine-using method for deciphering charred documents. A process calling for chloral hydrate and glycerine is described in an article in *Nature* by W. D. Taylor and H. J. Walls, which they believe, considering the simplicity and general applicability of the process, is a distinct advance over any previous method employed.

Briefly, the method consists in treating the charred document with chloral hydrate which appears to have a clarifying action on the burned figures or letters. This is applied in the form of a 25 per cent solution of chloral hydrate in alcohol. This is repeated several times, the document being dried at 60 C. between each application, until a mass of chloral hydrate crystals forms on the surface. At this stage, a similar solution, to which 10 per cent of glycerine has been added, is applied and the document dried as before. It may then be photographed; the most suitable type of plate being a contrasty noncolor sensitive one.

The method has proven equally satisfactory for typewritten and printed material. With certain modifications it has also been found to restore writing. Moreover, the reading matter is restored equally on both sides of the paper.

Taylor and Walls claim certain distinct advantages for this chloral hydrate method: (1) it appears applicable to any type of document; (2) it is fairly quick; (3) in their hands the method has never failed to produce readable results; (4) no special equipment, other than a copying camera, is required.

(From "Glycerine Facts," issued by the Glycerine Producers' Association.)

◆

CERTIFICATES FOR LEARNERS IN BOX PLANTS

Learner certificates, which will allow employers in set-up paper box factories to pay new employees 30 cents an hour for a period of six weeks training, will be used. This information was announced by Philip B. Fleming, administrator of the Wage and Hour Division, United States Department of Labor, Washington, in an effort to increase the number of training programs in the industry. It was also announced that application blanks may be obtained from the Hearings Branch of the Division.

Restrictions will limit the issuance of the certificates to employment in certain basic machine operations, with the exception of cutting, scoring, and splitting, which are higher paid operations, and also in hand operations. Another limitation states that the number of certificates must not exceed 10 per cent of the total number of workers in the factory. Individual circumstances will warrant special consideration when the general terms upon which the certificates are issued are not applicable.

◆

HINDE & DAUCH SELL MILL AT BROOKVILLE

Negotiations for the sale of the mill at Brookville, Indiana, have been completed by Mansel L. Rankin, paper and pulp mill broker. The name of the new owner has not been disclosed, but it is understood he is well-known in the industry.

The sale included the complete holdings of Hinde & Dauch at Brookville, Indiana, consisting of land, buildings, machinery, and equipment. The outstanding capital stock of the Brookville & Metamora Hydraulic Company was also included. Equipped with two paper machines, the mill will begin operations as soon as the reconditioning is completed.

◆

PAPER MILL MGR. IN ENGLAND IS SAFE

A visitor from the paper industry in England brought joyous news to Mrs. S. M. Hesser of Center Street, Corinth, New York, assuring her of the safety of her husband, who is manager of the Thames Board Mills, Limited, on the Thames River, near London.

Mrs. Hesser and her three children, all American citizens, arrived in this country in October, 1938, leaving Mr. Hesser at their home in Warrington, the heart of the industrial area of England located between Manchester and

First Paper Mill in the Fox River Valley

In 1855, this paper mill was established by Richmond Brothers at Appleton, Wisconsin. It was the first paper mill to be operated in the Fox River Valley, and straw wrapping paper was manufactured.

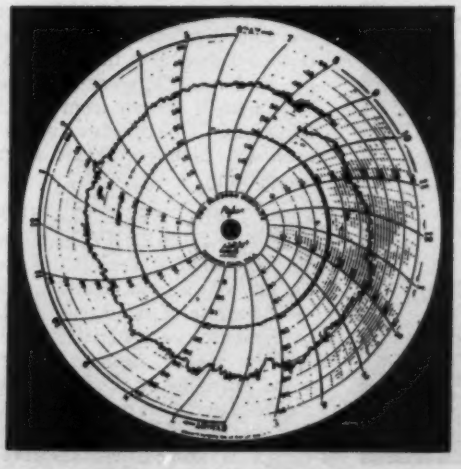
BRAMMER *Recording Consistency* CONTROL

TROUBLE-FREE ACCURATE SENSITIVE RECORDS ADAPTABLE

Both graphs are registered on the Brammer Recording Chart.

The outer graph represents accurately the consistency of the stock entering the head box from the stuff chest before any diluting water has been added.

The inner graph represents the consistency of the stock leaving the head box after diluting water has been automatically added in proper proportion to secure uniform stock consistency.



Brammer regulation of high consistency WASTE PAPER STOCK, diluted to a much lower consistency.

No moving parts so no lubrication (except diluting water valve stem); therefore low maintenance cost.

Detects, records and corrects changes in consistency over a wide range without sacrifice of accuracy.

Detects instantly the slightest variation of stock consistency due to sensitivity of precision instrument.

Recording of the consistency before and after diluting water has been added, on a twenty-four hour chart, permits detection and elimination of irregularity in stock preparation.

Time element between impulse detection and introduction of diluting water can be adjusted to suit mill conditions to get minimum lag and at the same time provide thorough mixing of diluting water and stock. Adaptable for all grades of stock, including rag. Simple design . . . easy to install and operate. Instrument by Foxboro.

An ever increasing number of users, with many repeat orders, evidence the satisfactory operation and broad acceptance of the Brammer Recording Consistency Control.

To improve the uniformity of your stock consistency write for Literature, and Brammer Control Questionnaire. No obligation implied.

Licensed under U. S. Patent Numbers: 1,810,111—1,894,075. Other Patents pending.

PAPER and INDUSTRIAL APPLIANCES
Incorporated
122 East 42nd Street, New York, N. Y.

Liverpool. Since then, she has had nothing from her husband except censored letters. He is a first lieutenant in the Home Guard known as England's second line of defense.

The bearer of first hand information as to Mr. Hesser's welfare was M. H. Morley, an executive of the Thames Board Mills, who is an Englishman by birth, but a naturalized American citizen. He was accompanied to this country by his niece, Miss Joan Howe of London.

Mr. Morley gave graphic descriptions of conditions in England. One interesting highlight is his statement that air raid shelters have been constructed beside each paper machine in the London paper mills and have proved quite successful.

The Thames Board Mills, Limited, also operates a paper mill on the Mersey River between Liverpool and Manchester, England.

CONVERTING PLANT ACQUIRED BY GOTHAM

A converting plant is being established at Salem, New York, by the Gotham Paper Company, operators of the paper mill at Battenville, New York.

Since its opening for the purpose of manufacturing tissue paper, the mill at Battenville has made extensive improvements continuously. At Salem the finishing operations will be carried on. The large rolls made at Battenville, will be rewound into toilet rolls and other finished products.

To prevent its sale to a wreckage company, the Village of Salem purchased the plant about two years ago. The Gotham Paper Company and the village have reached an agreement whereby the village will make certain improvements, including a heating system, and turn over the plant to the paper company, rent free, for a term of years on condition that the company maintain a payroll of at least $700 a week.

The ratification of the agreement must be turned over to the taxpayers as this is village property and a special election will be held soon.

The building was vacant several years until recently when the United Paperboard Company, Thomson, New York, used it for storage.

◆

MEAD CORP. NOW UNABLE TO TAKE ON NEW BUSINESS

Large contracts from the Federal Government together with the general up-trend of business conditions has made it necessary for the Mead Corporation, Chillicothe, Ohio, to refrain from accepting any new accounts until present obligations and contracts can be fulfilled.

The board mills are producing approximately 500 tons daily, with the white paper mills producing about the same. Three months production of these mills has been estimated at 100,000 tons. All of the corporation's mills are at present running at full capacity.

◆

FOREIGN NOTES

(The following items are taken from the *Foreign Commerce Weekly*, issued by the U. S. Department of Commerce.)

▶▶▶ IN BOTH CUBA AND ARGENTINA there is little demand for wall paper. In Cuba it is rarely used because of the long-standing local custom of painting the walls and also because the high ceilings of the homes and buildings create so much wall space that the cost of papering would be somewhat high. There is some market in Argentina, especially for the less expensive grades, but most of this restricted supply, in the past, has been obtained from Belgium and Germany with a small amount from the United Kingdom. United States prices have been too high to permit successful competition.

▶▶▶ THE PAPER-MANUFACTURING INDUSTRY in Spain was able to operate at about 40 per cent of capacity during the second quarter of 1941 because of an increase in the use of domestic raw materials and also an increase in the amount of imported wood pulp. Paper produced from domestic materials is not of high quality, but the demand is so great that the supply is immediately absorbed. At present, manufacturers are concerned about the possibility of arranging for

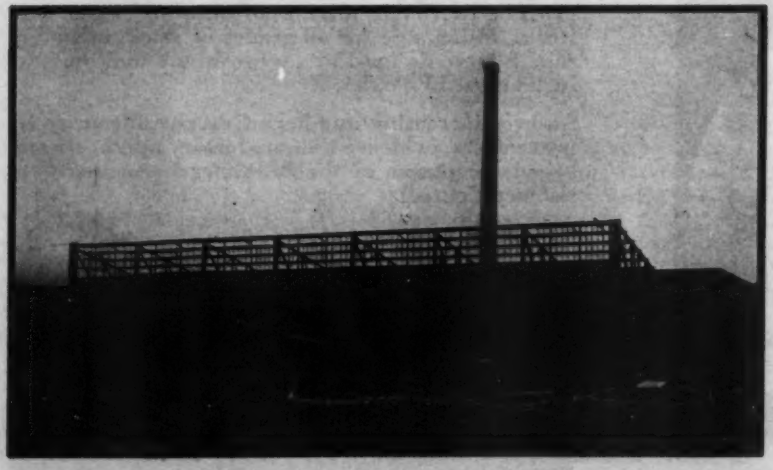
EXPANSION UNDER WAY AT THILMANY

A half-million dollar building and machinery expansion program was announced last month by officials of the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin. Contracts already have been signed for the construction of a building to house a new paper machine, and for the rebuilding of the present No. 8 fourdrinier machine located in the company's No. 2 mill.

The new structure, which will be erected adjacent to the bag factory at the lower mill, will be 70 by 300 feet, and most of it will be two stories high. It was necessary to move considerable railroad siding to make room for the building. Housed in the new building will be a new Yankee paper machine, 120-inch trim, and equipped with a twelve-foot dryer. The machine to be rebuilt needs considerable replacements and when finished will make possible the manufacture of a wider range of specialty papers. Contracts for the machinery were given to the Beloit Iron Works, Beloit, Wisconsin.

No increased production is contemplated in this expansion program, but rather it aims at better working conditions and increased economy. The new Yankee machine will make possible the discontinuance of two smaller machines, and the rebuilt machine will turn out the same amount of tonnage as before but will be capable of higher speeds. It is believed that the entire program will be completed early next year and the building itself will be ready by the first of the year.

Another new building at the Thilmany plant will house a new asphalt machine. The steelwork on this building is already under way.



This recent picture shows new building being constructed by Thilmany Pulp and Paper Company, at Kaukauna, Wisconsin, to house the company's new 120-inch asphalt machine.

FOR FINE FINISH

.....In keeping abreast of the individual finishing requirements of all papers, we have developed the most complete line of super-calender and embossing rolls in America. This wide selection...backed by engineering data and our broad experience in application...permits the choice of the right roll to produce the right finish on all super-calendered papers, with uniform production and long roll life.

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the delivery of several hundred tons of wood pulp which they had contracted to receive from North European countries.

▶▶▶ IN INDIA, paper mills set new peaks in production levels for each succeeding month during the second half of 1940. Production dropped slightly during the first quarter of 1941, compared with the fourth quarter of 1940, but production was substantially above that of the corresponding period of the preceding year and almost 50 per cent above the first quarter of 1939. During the first three months of the year the United States supplied approximately 280,000 pounds of kraft paper, valued at almost $21,000, but the demand has not been particularly keen, both because of the high prices and also because there are two Indian mills that produce a high quality kraft paper.

◆

▶▶▶ NEGOTIATIONS WERE RECENTLY COMPLETED whereby Robert Gair Company, Inc., New York, acquired the property and business of the Buffalo Division of the American Box Boards Company, Inc. The newly-acquired plant will be operated as the Fort Niagara Corrugated Box Division of the Robert Gair Company, Inc., North Tonawanda, New York.

Plant at Buffalo, New York, recently acquired by Robert Gair Company, Inc., from the American Box Boards Company, Inc.

WANT TO KEEP IT WITHIN SPECIFICATIONS ?

BENEFITS from using PQ Silicates in the beater are seen quickly by the skilled eye of the paper expert and also, they may be measured. With variable stock—use PQ Silicate to assure standard, uniform tests. It's a sure stabilizer.

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Manufacturers of
SILICATES OF SODA including
Sodium Metasilicate and Sodium Sesquisilicate

BRIEFS

▶▶▶ TO REFINANCE its outstanding 4½ per cent promissory notes, the Union Bag and Paper Corporation, New York City, announces it will issue $4,600,000 of new 2⅞ per cent serial notes with extension of one year in the final maturity date to January 1, 1952. The new notes have been taken in equal amounts by the Metropolitan Life Insurance Company and the Prudential Insurance Company of America.

◆

▶▶▶ AN EXPANSION PROGRAM costing approximately $22,000 involving an addition to the plant and the installation of new equipment, is being undertaken by Bradshaw's, Ltd., Toronto, Ontario. The new addition, which was necessitated because of the increased volume of business, will provide approximately 85,000 square feet of space. The program will be completed about the end of September.

◆

▶▶▶ A NEW 358 HP. BOILER is being installed by the Howard Smith Paper Mills, Ltd., at its Beauharnois, Quebec, plant. The work is expected to be completed by the beginning of September.

◆

▶▶▶ A TISSUE MACHINE to trim 93 inches was recently purchased by the Dominion Envelope Company, Toronto, Ontario. The machine was bought from the Orono, Maine, mill of the Eastern Corporation.

◆

▶▶▶ CIVIL SERVICE EXAMINATIONS will remain open indefinitely for those workers desiring employment in specialized fields connected with the National Defense Program, according to a recent announcement issued by the United States Civil Service Commission, Washington, D. C. Specialized men are needed in such fields as chemicals and allied products, paper, plastics, aircraft, iron and steel, etc. Application forms may be obtained from any first or second class post office.

◆

▶▶▶ PLANS FOR THE INSTALLATION of two new digesters at the cost of $500,000 in the British Columbia Pulp and Paper Company, Ltd., were recently announced by Lawrence Killam, president. They will be installed in the Port Alice and Woodfibre plants in British Columbia. The increased demand of United States markets necessitated this change, which will increase the production of each plant from 150 to 190 tons daily.

▶▶▶ SEVERAL CHANGES are being made at the Collins Manufacturing Company, North Wilbraham, Massachusetts. A new air dryer, for the production of cockle finish bond paper, has been installed, while further improvements are planned for the next few months. One of the next steps to be taken will be the enlargement of the power plant to handle increased requirements of power due to expanding production.

◆

▶▶▶ THE REDUCTION IN CONSUMPTION of titanium dioxide, which was suggested by the Dominion Government, has been agreed to by Canadian fine-paper makers.

◆

▶▶▶ DOMESTIC NEWSPRINT PRICES will be increased for the last quarter of 1941, according to announcements by various paper companies. Great Northern, Maine Seaboard, Algonquin, and Gould Paper Company are among those which have announced an increase of $1 per ton, to bring the total to $50, New York. Canadian mills, owing to heavy war taxes, are also studying the price question.

◆

▶▶▶ A 77½ PER CENT REDUCTION in Britain's newsprint consumption has been realized since the outbreak of war. In September of 1939, statistics showed that Britain used 1,108,552 tons of newsprint a year—21,326 tons a week. These figures gradually have been reduced so that at present only 249,000 tons are used annually. Approximately 1,500 newspapers were used to arrive at these figures.

◆

▶▶▶ VITAMIN CAPSULES were given to paper mill employees of the St. Helens Pulp and Paper Company, St. Helens, Oregon, in what is believed to be the first plan of its kind to find its way into the pulp and paper industry. The cost of the plan, which is said to be a form of health insurance, is taken care of by the company. No compulsion is used; it rests entirely with the individual worker whether or not he takes the pills.

◆

▶▶▶ THREE DAYTON, OHIO, PAPER BOX MAKERS are facing extreme difficulty in obtaining raw materials from boxboard manufacturers, who are from 10 to 12 weeks behind in filling orders. Priorities is held to be the cause of this shortage of raw materials. Those affected by the shortage are Rike Paper Products Company, Gebhart Folding Box Company, and the Aull Brothers Company.

TWO-WAY STRETCH

Towmotor Increases Storage Capacity

Towmotor actually does "stretch" storage capacity . . . stacking multi-ton loads up to 25 feet high, expanding storage area without increasing floor space. And Towmotor does the job *faster* . . . traveling with capacity loads at speeds up to 10 miles per hour, lifting full-rated loads at speeds up to 40 feet per minute. But, there are many more reasons for building your improved handling system around Towmotor.

Towmotor loads or unloads box cars, trucks in *minutes* instead of *hours*. Handles materials in 1,000 to 10,000 lb. "units" instead of small individual loads . . . eliminating costly re-handling in receiving, storing and shipping, keeping materials well ahead of men and machines.

Short wheelbase and small dimensions combine in Towmotor to provide high maneuverability . . . for fast, safe, easy work in crowded quarters. One man and a Towmotor can handle loads that would be a task for 10 men . . . faster, cheaper. Towmotor is straight gas-powered . . . works 24 hours a day for less than 24 man-hours cost you.

Today, while production is near capacity, put the "spotlight" on your materials handling methods. Compare present capacity, speed, costs with what Towmotor can provide. You'll see how Towmotor will "stretch" your handling dollar, prepare you for competitive years ahead.

TOWMOTOR COMPANY, 1271 E. 152nd Street, Cleveland, Ohio

ADVERTISING PAGES REMOVED

NORTON ABRASIVES

Norton Researchers are paid for being Wrong!

In the endless work of Norton scientists to make better grinding wheels and other abrasive products many experiments fail to achieve the goal desired. But these failures result in the elimination of means and methods that will not work and actually are stepping stones that advance through the process of elimination.

Long before the abrasive industry was confronted with its present huge task, Norton research was doubled. Research through the lean years has resulted in discoveries which are doubly important today when every minute counts, and the great need of the hour is the most exacting precision and the greatest possible manufacturing dispatch.

•

NORTON COMPANY, Worcester, Mass.

BEHR-MANNING DIVISION, TROY, N. Y.—Abrasive Paper and Cloth

WHEN IT'S AN ABRASIVE PROBLEM CALL IN NORTON ENGINEERING

Editorial

Priority Orders

▶▶▶ THE PAPER INDUSTRY at last is waking up the fact that its products, while not on the "critical list" of defense commodities, are critically necessary to the program.

The evidence of the awakening is the almost hysterical efforts which some mills are now making to acquire priority defense orders, bearing high preference ratings. They have to have these defense orders in order to keep operating. They are plentiful and the volume of them is increasing every day. However, up to very recently, paper mills have not been anxious to have them because they have been flooded with orders from civilian consumers sufficient to keep them at capacity production for the balance of the year, in some divisions, particularly the kraft pulp, board and paper divisions, which are the big tonnage divisions of the industry.

In July, when the defense expenditures by the Government aggregated nine hundred and forty million dollars, a multitude of defense paper orders appeared. These orders called for priority in manufacture and preference in shipment over any other type of orders on the books of the mills.

A great many mills were reluctant to take these defense orders as they felt obligated to ship the tonnage which had been previously accepted and set for shipment to their regular customers. However, it then became apparent that to refuse to enter and ship the defense-preference orders automatically would deprive the mills from obtaining any preference on their needed supplies of critical materials like steel, aluminum, copper, brass, chemicals, and the like. That slant changed the whole picture almost over night.

In other words, the Government, which has taken under priority control a large number of critical materials, can see no reason why it should supply those materials to any concerns which are not producing commodities for government defense projects.

As to the ethics of the situation, it is plain, we think. If it is conceded that the Government can draft its men of the nation for its defense, certainly it can draft the paper products of the mills for their equipment and maintenance.

It is inevitable that the paper production must be delivered on defense orders, and that defense orders will take a large part of production. So, the shift is on. Defense orders have the right-of-way over civilian or any other type of orders for the future. Any mill when presented with a priority order must accept it. It is mandatory, and it makes no difference who sends it as long as it calls for regular grades, sizes, and weights, and bears a priority order number and preference rating. If the mill doesn't take it, it won't get supplies of materials necessary to keep operating. What use will a closed mill be to the defense program or to civilian customers?

The paper industry is not under priority rule as the steel industry is, the reason being that there is not enough steel produced to fill the defense and civilian demand—so, steel is rationed under a system called "priority."

The paper production has been sufficient up to date to fill the civilian demand and defense orders. However, the Government requirements for paper products are mounting rapidly. The Government's priority orders must be executed promptly. If there should occur any difficulty in lodging defense orders with the mill, and should any delays seriously hold back commodities, the Government immediately will take paper under priority rule. In our judgment, that is an event which should be avoided.

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Unnecessary Waste Must Go

▶▶▶ IN THESE TIMES of priorities, and with pulp and paper mills generally running at peak capacities, the need for vigilant control of mill waste is a paramount duty of management and employee alike. Naturally, it is impossible to eliminate waste entirely from industrial operations; but most certainly some wastes are unnecessary, and the amount of other wastes is controllable within certain limits.

Some mills always have been on the alert to minimize wastes; other mills have overlooked the actual cost of waste to them and only have done such work in the control of waste as has been forced upon them by manufacturing procedure.

In this category of wastes that stand out prominently are: waste of fibrous and non-fibrous raw materials; waste of fuel, steam, and electrical energy; waste of lubricating oils and greases; waste of machinery and equipment; waste of water; and, probably most important of all, waste of human effort.

At the root of much of the waste in industry is carelessness, the "It's good enough" spirit, or the "Why should I worry? . . . I am not responsible" attitude.

For apparent reasons, these points of view are more prevalent in times of industrial activity than when work is slack and jobs are few. Therefore, the need for leadership at the present time in directing a campaign against unnecessary waste in the individual pulp and paper mill organization cannot be stressed too strongly.

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Take a Lesson from Football

▶▶▶ WITH THE PASSING OF Labor Day, it's football time again. Squads are being called back to school and college for practice training. Coaches from coast to coast, and from North to South, are putting their men through strenuous workouts. Soon these cleat-shod and leather-helmeted youths will be stirring up the dirt and mud of the country's gridirons, and they must be prepared to "take it."

Schedules have been arranged; plays must be perfected; and games must be won. A team without a schedule would be like a sailor without a boat. A team without a well-developed system of plays would be like a tenderfoot in the hands of a veteran. A team without the ability to make a well-developed system of plays effective would be like a fighter without any punch.

Planning, scheduling, and effective action are just as important to the individual business organization as they are to the football team. Take a lesson from football and profit from it.

ADVERTISING PAGES REMOVED

CURRENT THOUGHT . . . . . .

SHORTAGES—AND THEIR CORRECTION

WILLIAM SIBLEY

▸▸▸ PROBABLY THE BIGGEST PROBLEM in industry today is shortages,—or at least the threat of shortages. Yet the most of us have been back and forth across the face of this nation and have seen mile-long steel mills, block-long paper machines, factories occupying hundreds of acres, iron mines and bauxite deposits so large they stagger the imagination, endless miles of railways, an entire cobweb of highways, quiescent yet powerful waterways, not to speak of power plants unequalled in all the world. It is simply incredible that a country so great and having so much could be "all out of machine tools," . . . "all out of paper," . . . "all out of monkey wrenches," . . . or "all out of steel," or anything else made here at home out of domestic materials, the abundance of which is at our bid and call.

Are we truly "all out," or is it just that, having so much, we take for granted our abundance and have never before had to conserve? Isn't it largely because we never have had to be careful with things to make them last longer—the practice of which art is well known to such people as the Hollanders, Frenchmen, Germans, Chinese, and many others who never had much? Sure—the industrial advertising men and the salesmen of material handling equipment have talked and preached the doctrine of "longer life," "cost cutting," "efficient operation." But in practice, the mill and plant men are just as prone to extravagance as the housewife or the office worker. The housewife throws away a garbage which would make a rich meal for certain foreigners. The office man is violently wasteful of paper, paper clips, pins, carbon paper, even his desk and typewriter. But in like measure, the mill man is equally extravagant in the use of materials, tools, supplies and equipment. Perhaps even more so than all of us who are wasteful of tooth paste, butter, golf balls and gasoline. Neither at home nor in business are we a nation of string-savers. We haven't had to be.

Now we *do* have to be. Considering all that is at stake, it is intolerable that vital implements of production should be used wastefully, or allowed to gather dust in forgotten bins, or that inefficient production practices should be continued. I'll bet you a Stetson hat against a doughnut with a hole in it that much of present shortages could be alleviated by taking action along some of the following lines:

A—Substitute standards for specials. Standard tools and equipment will do 99.44 per cent of the jobs now in front of industry. Specials are a fetish of many buyers and plant men. Being individuals—they like to be individual. Standard tools and equipment can be produced faster, in greater quantities and usually cheaper. Specials defeat the ideals and object of mass production. Delay in waiting for the delivery of specials means delayed defense production.

B—Make everything count. There is a right and a wrong way to use everything. The right way means longer life for both materials and tools. The wrong way means abnormally quick consumption and places undue demands on producers.

C—Allow for higher production speeds. The speed-up changes the rules of use for many tools and supplies. Unless the "carburetor" is set for "faster production," we're soon out of gas. The carburetor can be set as any manufacturer can testify.

D—Dust off surplus stocks. In every plant, untold wealth is lying about in the form of bars, gears, sheets, wrenches, bolts, valves, elbow joints, etc.,—things bought years ago and now not needed by their owners. If the total of all such dead, but perfectly good, items was brought into the light, much of our shortages would disappear overnight.

E—Recall pensioned equipment to service. Many machines long written off as obsolete because of missing parts or worn parts, could be restored in half a day's time through the installation of tools and parts now resting on stock room shelves.

F—Waste no time. There is as much waste in time as there is in materials—probably more. Clerks get hungry along about 10:30 and go to the plant cafeteria or the corner drug store (via the washroom) for a "coke," a cup of coffee, or a cigarette. None of these things are the prime movers of such absence from the desk. The main reason is a recess from work. Meetings of executives are charged with wasted time because some one member there has recently heard a "good story" and wants to re-tell it. Thousands of hours of effort are wasted because of childish, needless errors in addressing mail or packages, crating material in such a way that the crate is broken before it reaches its destination. In these times, when there is no time to lose, it is the little things that count. We have no choice now—*there is need for hurry and conservation.*

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▸▸▸ WHAT WITH CICADAS SHRILLING merrily, the corn ears sagely in beard, the big blobs of cotton riding the blue, and other mellow hints of Autumn—aren't you slightly nostalgic for the old orchards where the pippins are honey-sweet with juice; for the by paths bordered with hazel bushes and flaming sumac; for the peace that the moonlight bestows on the cornshocks? . . . . . Or for the fragrant balsam growing in deep-cleaving valleys packed with hush; or the brackish smell of rush water over which you can hear the harsh quack of the mallard? . . . . . Or the haw tree that now looks like a giant watercress salad sprinkled with red pepper; or the big-bellied melon that snuggled so temptingly between the rows of uncut stalks just far enough over the fence to give you the thrill of devilishness when you deprived Farmer Brown of what was rightfully his? . . . . . Or the insistent squeak of the whiffletree accompanied bass clop-clop of the horse's hoof as she trots you through the kind of moonlight that soften the things of harsh reality into objects of beauty? . . . . . Yes—*I* am!

Measurement of Moisture in Paper

by the Resistance Method

D. C. CULVER
The Brown Instrument Company

▸▸▸ THE MOST IMPORTANT single factor in the paper drying process is the problem of obtaining a uniform amount of moisture in the finished sheet. Great strides have been made in recent years in increasing the efficiency of drying, but accurate measurement of the final moisture has not, until now, been possible. The fact that there has been no way to directly measure moisture, independent of all other factors, except by the laborious laboratory method of sample weighing, has proved a stumbling block for all those who have attempted to overcome this problem.

It has, therefore, been necessary to use some other measurable characteristic of the sheet as an indication of its moisture content. Several systems have been devised taking humidity, sheet temperature, sheet tension, or work done by the sheet as indicative of the moisture present. All of these have been of some help, but have been only partially successful due to the limitations inherent in the principles and methods employed. They are all crude, slow in response, and critical to the many other variables present.

After extensive investigation of the problem, the conclusion was reached that the electrical *resistivity* of the sheet was the most stable indication of the moisture present, and least affected by extraneous conditions. Accordingly, the past six years have been spent in developing an instrument in accordance with this principle, which is independent of the most troublesome variables and is, in addition, quick to respond and simple in its operation. By use of a balanced Wheatstone bridge wherein any temporary unbalance is electronically amplified, it is possible to make the instrument rugged and stable in its operation without sacrificing the sensitivity required in a bridge measuring the high resistances encountered in this application.

Development Work

In order to determine to what extent the moisture-resistance relation is affected by the other variables present, test runs were made on several types of paper and complete records kept of all varying factors in the process. In Figure 1 these conditions for eleven types of paper have been tabulated. Figure 2 gives the moisture-resistance relation for each type, the curve number representing the run numbers as shown in Figure 1.

These tests were all made on a fourdrinier machine at the New York State College of Forestry, Syracuse, New York, and were made under the same general operating conditions so that any variation due to different conditions between one machine and another are eliminated.

Further observations have been made in several other mills, and the discussion of the above runs will be supplemented with facts learned there. The data is entirely based on results secured on machines, not in test tubes.

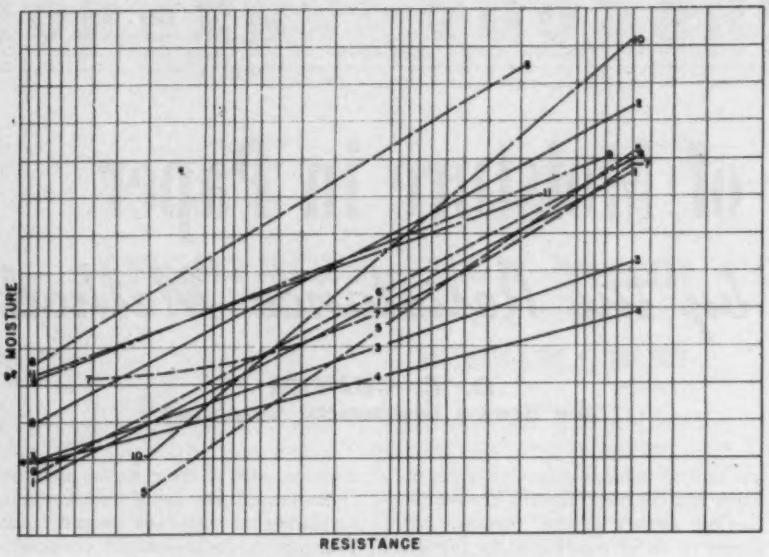
Moisture Sampling

In order to obtain an accurate check on the instrument, it was first necessary to develop an accurate means of taking paper samples from the sheet, weighing, drying, and reweighing them.

It is a well-known fact that the moisture in a sheet of paper can change rapidly when it is not in equilibrium with the surrounding air. It is, therefore, necessary to remove the

	Run #1 -4-9-39 Manila Drawing	Run #2 -4-6-39 Bristol	Run #3 -4-13-39 Mimeograph	Run #4 -4-19-39 Book	Run #5 -4-24-39 Newsprint	Run #6 -4-25-39 Kraft Wrapping	Run #7 -4-26-39 Manila Tag.	Run #8 -5-8-39 Greaseproof	Run #9 -5-9-39 Red Wrapping	Run #10 -5-10-39 Newsprint	Run #11 -5-15-39 Bond
FREENESS											
Beater Chest	350	290	270	370	213	360	252	220	305	175	440
Jordan Stuff Box	250	260	250	340	193	257	230	165	270	150	193
Head Box	220	250	170	150	119	170	244	125	190	75	105
TRAY WATER											
pH (average)	4.5	4.5	5.4	5.1	5.7	5.3	5.6	4.9	5.1	5.8	5.6
SIZE											
Rosin (%)	2.0	2.0	.75	.5	1.0	2.5	2.5	1.5	3	---	1.5
Alum (%)	2.5	1.0	1.2	1.2	1.2	4.5	4.5	2.00	4	1.5	2.0
Sodium Silicate (%)	---	2.0	---	---	---	---	2.0	---	---	---	---
Starch (%)	---	2.0	---	---	---	---	---	---	---	---	---
FILLERS											
Clay (%)	---	10.0	10.0	30.0	5.0	---	---	---	---	---	---
DYES (Gm/500#)											
Auramine	60.75	---	---	---	---	---	0.1	---	317.50	---	54
Acid Orange	45.25	---	---	---	---	---	0.1	---	589.00	---	---
Direct Deep Blue	18.00	---	---	---	---	---	---	---	---	---	---
Methyl Violet	---	---	1.5	1.0	0.3	---	---	---	---	---	---
Fast Bond Blue	---	10.0	---	---	2.7	---	---	---	---	---	---
Saffranine	---	---	---	---	---	---	---	---	317.51	---	---
Paper Yellow	---	---	---	---	---	---	---	---	---	---	83
SHEET											
Av. Caliper (.001")	7.4	6.6	4.0	4.7	6.1	3.5	9.1	3.8	3.2	5.4	3.8
Av. Temp. (°F.)	283	197	238	215	205	190	209	83	90	134	165
Speed (ft/min.)	72	72	269	195	238	200	125	125	125	150	125
STOCK											
Unbleached Sulfite (%)	100	---	---	---	20	---	60	---	100	20	---
Bleached Sulfite (%)	---	35	50	70	---	---	---	100	---	---	100
Kraft (%)	---	---	---	---	---	100	---	---	---	---	---
Soda (%)	---	15	50	30	---	---	---	---	---	---	---
Groundwood (%)	---	---	---	---	80	---	40	---	---	80	---

FURNISH AND OPERATING CONDITIONS
FOR FOURDRINIER SHEETS
FIG. 1



MOISTURE – RESISTANCE RELATION FOR VARIOUS GRADES OF PAPER

FIG. 2

sample from the sheet and seal it in a dry can as quickly as possible. A special device consisting of two razor blades mounted parallel to one another was used to slit the paper in the machine direction. The end of the strip was then knocked out and the strip (1½ inches wide) was fed into a dry aluminum can which, when full, was quickly sealed with a tight fitting lid. On high speed machines, this procedure would be more difficult, but the low speeds of the machine under test permitted the use of this method very successfully. An average time of about 12 seconds was necessary to remove a sample from the sheet and seal it in the can.

The complete procedure used in taking samples was as follows:

1) The sample was taken from the sheet as previously described and sealed in a can which had been kept overnight in a desiccator to insure its being entirely dry.

2) The can and sample were then weighed.

3) The can alone was weighed.

4) The can and sample were dried in an oven at 220 deg. Fahr. for a period of at least four hours.

5) The can containing the sample was removed from the oven, sealed and placed in a desiccator to cool.

6) The can and sample were weighed.

7) The can was again weighed as a check against any moisture remaining in it at the time it was weighed after containing the wet paper.

8) The per cent moisture was calculated on the wet weight basis.

It should be noted that all possible errors were eliminated in this procedure. The paper was quickly sealed into a can known to be dry; the temperature of the cans and sample were the same when weighed both wet and dry and the cans were weighed twice as a check on both their weight and the possibility of the can obtaining moisture from the wet sample. On the whole, it is estimated that the accuracy of this method was .05 per cent moisture.

EFFECT OF VARIABLES

As can be seen from Figure 2, each paper has its own moisture-resistance relation. Examining these curves in conjunction with Figure 1, the variables are classified as follows:

I—*Furnish:* (1) Size, (2) Filler, (3) Stock, (4) Dye.

II—*Process:* (1) Freeness, (2) *p*H, (3) Temperature, (4) Speed, (5) Caliper, (6) Machine Ventilation, (7) Static.

I Furnish

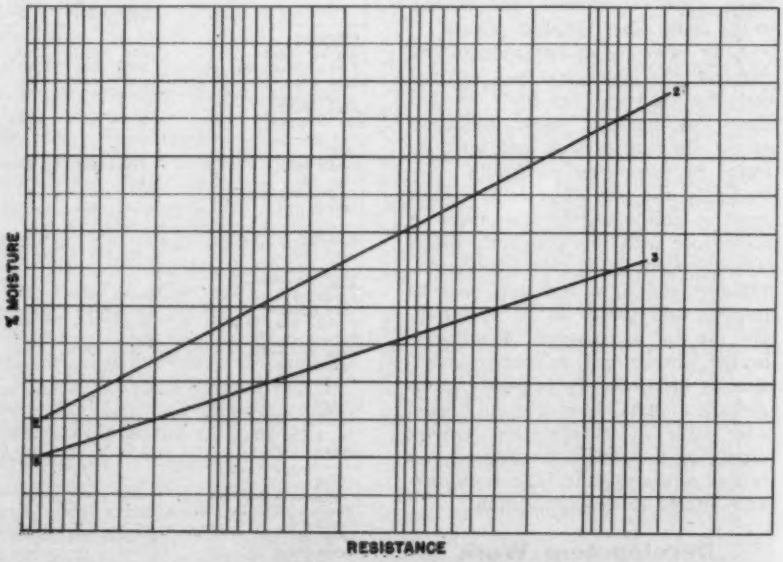
1. Size

The sizes considered are rosin, sodium silicate, starch, and alum. Alum, of course, is not truly a size but is a precipitant for the size present and improves the retention of clay.

Theoretically, it would seem that increase in the amount of size would increase the resistance. This is borne out by examination of curves Nos. 2 and 3 (Figure 3) which are practically identical with the exception of size, No. 2 containing considerably more size than No. 3. The smaller slope of curve No. 3 is probably due to the larger amount of free alum present which gave clay retention. Thus an increase of from .75 per cent to 6 per cent of size produces a calibration shift of 1 per cent moisture at the dry end and a 3.5 per cent shift at the wet end ignoring the increase in clay retention which we cannot calculate from the data available.

2. Filler

Clay has a very pronounced effect on the moisture-resistance relationship



COMPARISON OF BRISTOL AND MIMEOGRAPH PAPER CALIBRATION

FIG. 3

at the higher moistures, but only little at the lower moistures usually found in paper leaving dryers. Its effect is to produce a decrease in the slope of the curve and to somewhat decrease the resistance for a given moisture. Comparison between curves No. 3 and No. 4 (Figure 4) quite clearly shows this effect.

The shift at high moistures is approximately 1 per cent for an increase of from 10 per cent to 30 per cent of clay added to the furnish. The retention of clay was practically identical for the two runs shown in Figure 4.

3. Stock

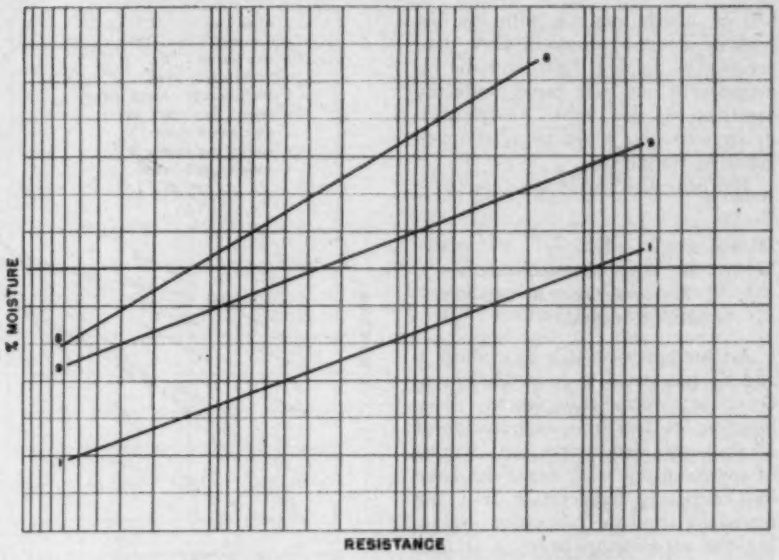
Examination of the data shows no correlation between the type of stock and the moisture-resistance curve. While there is no doubt that the various types of wood fiber do not have the same resistance, the difference is apparently small in comparison to the other factors present. This has been further borne out on several field installations.

From field observations on machines running rag stock it has been observed that the per cent rag present has a definite influence on the moisture-resistance relationship with an increase in rag content giving a lower resistance for the same moisture. The calibration for any one grade of paper does not vary and the performance of the instrument is as satisfactory on rag papers as on wood pulp stock.

4. Dye

All dyes included in this analysis are of the synthetic type. Natural dyes and pigments are not included and no data on their action is available at this time.

There is definite proof that small amounts of dye will not affect the reading and that large amounts of dye will. This is shown by curves No. 1 and No. 9 (Figure 5). These papers are similar in every respect with the exception of temperature and dye. From the temperature difference (190 deg. Fahr.) the No. 9 curve should lie above No. 8. (Refer to the following discussion of temperature.) However, due to the large amount of dye present No. 9 has been considerably dropped. A second run of mimeograph was made on this machine with the quantity dye raised to 25 pounds per 500 pounds of stock. The curve experienced a linear shift of approximately 0.3 per cent lower moisture for the same resistance. It is estimated that changes in dye up to 100 grams per 500 pounds of stock will produce no noticeable calibration shift. Beyond this value a shift may be expected.



COMPARISON OF MANILA DRAWING, GREASEPROOF, AND WRAPPING PAPER CALIBRATION

FIG. 5

II Process

1. Freeness

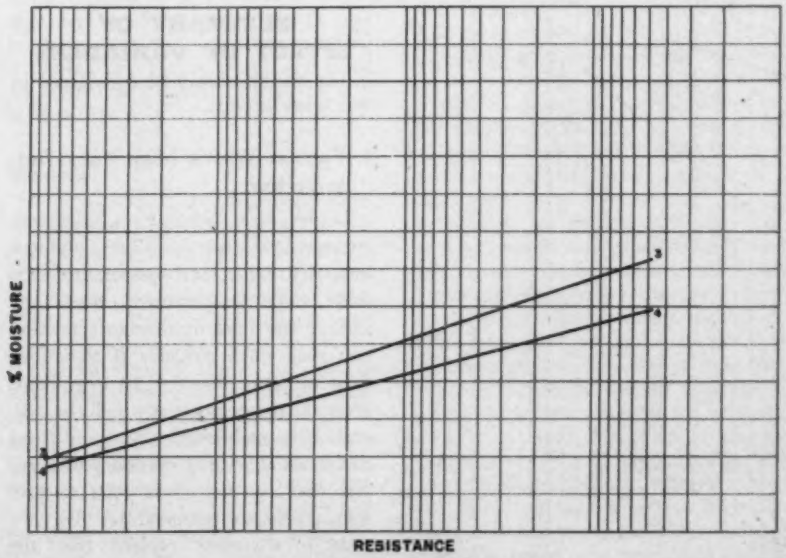
No effect due to change in freeness has been found. Inasmuch as the resistivity of the fibers and their solution is measured directly, the formation of these fibers—of which freeness is a measure—could be expected to have little, if any, effect and results verify this.

2. pH

Over the range of 4.5 of 5.8 *p*H, as shown in these tests, no effect due to this variable can be detected. This is probably due to the relatively small amount of solution present at the point of measurement. (Again attention is drawn to the fact that billions of ohms are measured.) This factor can, therefore, be considered constant over the normal range of values experienced in this process.

3. Temperature

Temperature changes at the point of measurement produce a decided change in the moisture-resistance curve. This is shown on run No. 10 (Figure 6)



COMPARISON OF MIMEOGRAPH AND BOOK PAPER CALIBRATION

FIG. 4

half of which was run with the last bank of dryers at an atmospheric temperature of 84 deg. Fahr. and the remainder of the run made with the dryers at 184 deg. Fahr. As can readily be seen, the warm paper is much lower in resistance.

The general form of this type curve is:

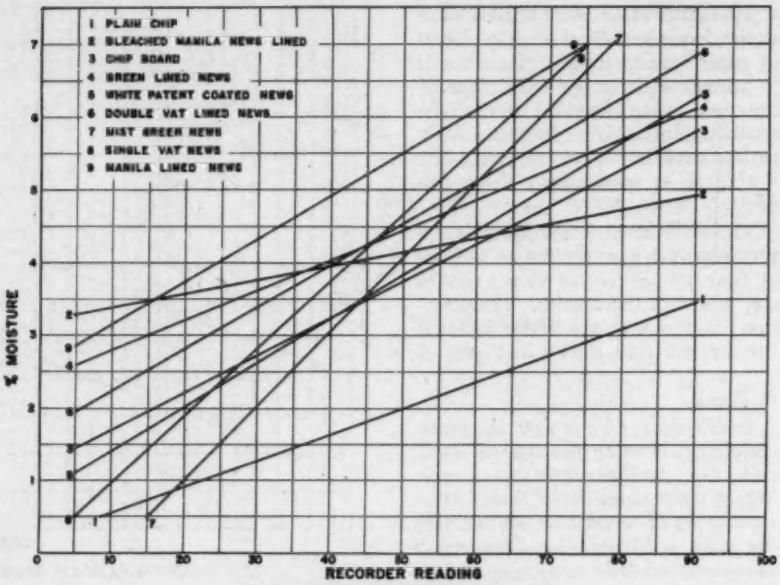
$M = n \ \mathrm{Log}R + K$

Where M = per cent moisture
R = resistance in negohms
n&K = constants

An attempt was made to evaluate n and K, but the data is insufficient to obtain any worth while results. It is, however, evident from examination of all the curves that temperature changes of approximately ±20 deg. Fahr. from the calibrated temperature will not materially affect the calibration providing the paper temperature is at least 150 deg. Fahr. This means that the shift is not linear with respect to temperature. Also, the greatest shift seems to occur at the lower temperatures. For this reason, it is recommended that the paper be measured at a point in the process where it is at a temperature of 150 deg. Fahr. or higher.

4. Speed

No effect due to speed changes are indicated either in these tests or in other installations. Inasmuch as the response of the measuring circuit is practically instantaneous, no error due to lag is present and it is reasonable to expect no change due to speed variations.



MOISTURE-RECORDER READING FOR BOARD PAPERS

FIG. 7

5. Caliper

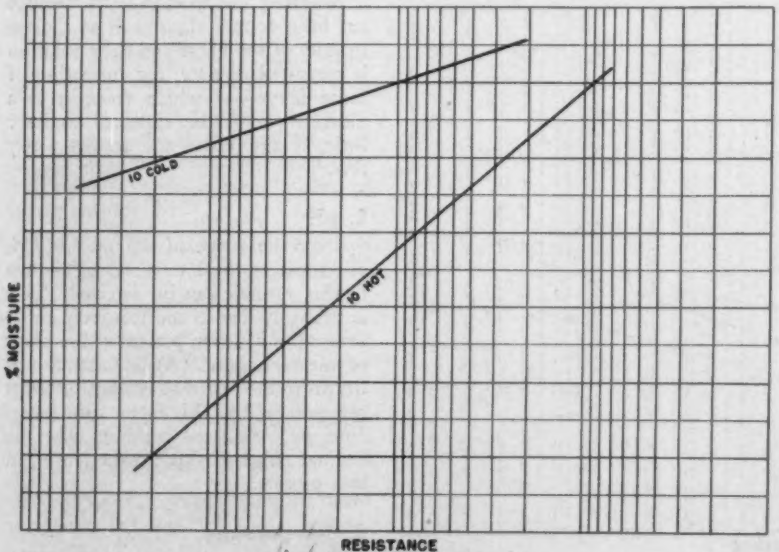
The caliper of the paper does not affect the reading. Tests have shown that variations of + 100 per cent or — 50 per cent have no effect. This is further borne out on the tests on board and the data on this factor is considered conclusive.

6. Ambient Humidity

The resistance of paper bears no relation to the ambient humidity unless the humidity is so high that water actually condenses on the surface of the sheet, in which case the instrument will tend to measure across the sheet to the edge rather than through the sheet.

7. Static

On several early installations, static electricity in the sheet caused quite wide shifts in the curve. However, means have been devised and field proved whereby troubles from this source are eliminated except on heavy board (045 in.), run at 3.5 per cent moisture or less.



COMPARISON OF NEWSPRINT CALIBRATIONS AT 84°F. AND 184°F.

FIG. 6

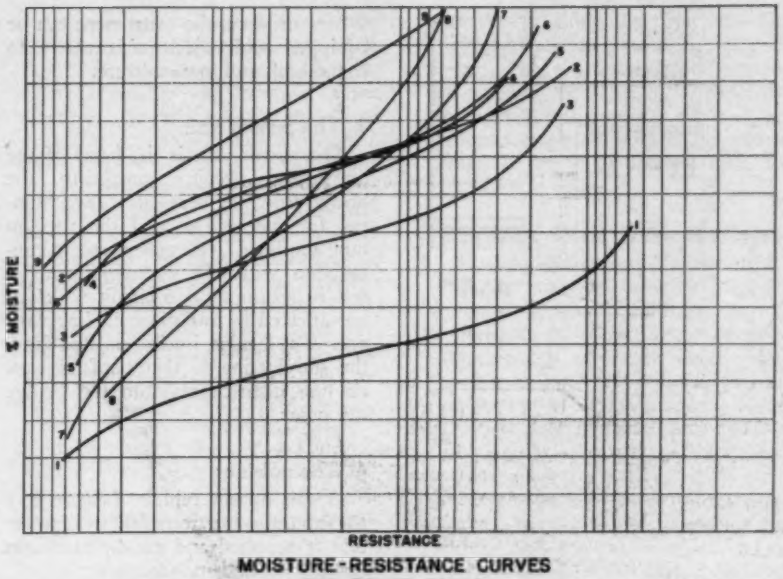
SUMMARY OF EFFECT OF VARIABLES

The variables may be considered in two other groups,

1. Factors Which May Vary During a Run

Under this heading is included, freeness, *p*H, speed, caliper, ambient humidity, static, and temperature. Of these only temperature causes any shift in the moisture-resistance relation and then only seriously if variations exist of more than ± 20 deg. Fahr. from the temperature at which the calibration is established. To avoid these variations it is only necessary to regulate the last two dryer rolls to produce a constant temperature.

It is therefore evident that the moisture-resistance relation will hold regardless of the processing variables present.



MOISTURE-RESISTANCE CURVES FOR BOARD PAPER

FIG. 8

2. Factors Which Vary From One Paper to Another

In this group must be considered size, filler, stock and dye. All of these factors may produce a calibration shift but are usually held quite constant for any grade of paper.

The result of this investigation shows, therefore, that for any grade of paper the resistance-moisture relation can be expected to hold, but each grade of paper will have its own curve which may or may not coincide with that of other grades run on the same machine. This means that on any machine running several grades of paper the number of calibration curves may be large, while on machines running a limited number of grades the work necessary for original calibration will be less.

Board

The types of paper discussed have all been fourdrinier sheets. While the data is not as complete on board, the nine curves shown on Figure 7 give an idea of the results obtained here. These were all box or shirt boards consisting of a liner, news filler, and back.

One of the first things noticed on examining these curves is that the slope of two types of paper—curves No. 7 and No. 8—is much more steep than any of the others. Investigation of the furnish revealed that these were the only papers containing kraft which has the effect of increasing the slope of the moisture-resistance curve.

It is also noticed that curve No. 2 has less slope than the remainder of the group. This is further evidence of the effect of clay as this sheet was rather heavily loaded with this filler. The only other sheet containing any filler was No. 5 which contained approximately 10 per cent clay. The effect of this can also be seen.

The low placement of curve No. 1 is mainly the result of the high temperature at which it was run. This paper was chip board used for shirts and was well dried to give a stiff, snappy sheet. Higher roll temperatures are always used for this grade.

The co-ordinates of these curves are not the same as those used for the moisture-resistance relation of the fourdrinier sheet. The reason for this is that these curves are not straight lines on semi-log co-ordinates but take the form of an "S" curve as shown in Figure 8. Inasmuch as it is easier to discuss the slope and placement of curves when they are straight, rectangular co-ordinates were used in this discussion.

Actually all papers have an "S" shaped resistance-moisture curve if one takes into consideration resistances from zero to infinity. At the higher resistances, the increase in resistance is quite great in proportion to the decrease in moisture thereby causing the curve to approach infinity asymptotically. As lower resistances are reached, there is a small change in resistance experienced for a large change in moisture, the resistance, therefore, approaching zero asymptotically. Between these two end zones the curve is substantially linear, and normal moisture content lies in this region and can easily be measured. In the high resistance region our resistance change is so great for a given moisture change that the range of the instrument is very limited. In addition, for resistances above 50,000 megohms the insulation problem becomes great.

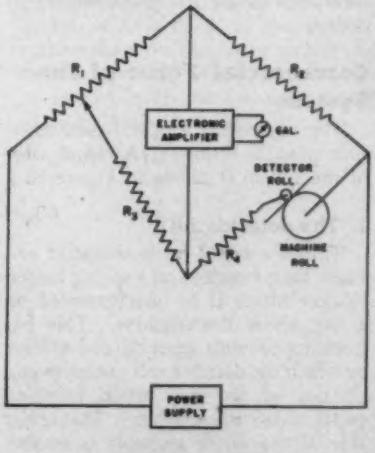
The lower limit of resistance is that point at which we begin to measure the conductivity of the solution in the paper rather than the amount of solution. This point has not been definitely located but tests have proved that at resistances below 25,000 ohms the moisture-resistance relationship becomes unstable. This point is at approximately 27 per cent moisture on those papers tested so that we feel safe in setting an upper moisture limit of 25 per cent on the instrument.

It is, therefore, seen that the lighter weight fourdrinier papers have a wider resistance span over which they are linear than do the multiple layer sheets. The reason for this lies in the difference in structure of the two sheets and the consequent difference in moisture distribution.

Principle of operation of the instrument

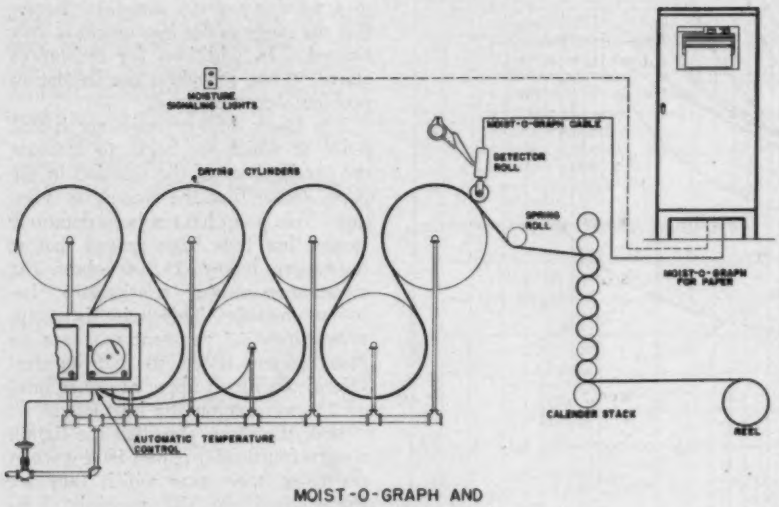
The basic circuit is illustrated schematically in Figure 9. The bridge is supplied with power from a standard radio type power supply consisting of a transformer, rectifier tube, and filter.

The bridge consists of R_1, R_2, R_3, R_4, and the paper resistance in series with R_4. R_1 is the slide wire in the instrument. This resistor is automatically adjusted by the mechanical linkage of the recorder which is in turn positioned by the galvanometer thus keeping the bridge in balance for changing values of paper resistance. Resistor R_3 produces the necessary characteristic to the scale and in addition isolates the detector roll from any electrical hazards.



SCHEMATIC DIAGRAM OF MOIST-O-GRAPH

FIG. 9



MOIST-O-GRAPH AND DRYER CONTROLS FOR PAPER MILLS

FIG. 10

Inasmuch as the resistances being measured are high, the current in this bridge is extremely low. Therefore, it would require a most sensitive galvanometer of the laboratory type to detect small unbalances. Such a galvanometer could not be made rugged enough for commercial purposes. It is therefore necessary to electronically amplify the unbalances occurring before feeding them into a standard commercial galvanometer. The amplifier consists simply of a thin triode tube in which the bridge is fed into the grids and the galvanometer is placed across the plates. When the grids are at the same potential, and the tube balanced, the plate currents are equal and the galvanometer does not deflect. As soon as any unbalance occurs in the bridge the grid potentials change which in turn changes the plate currents, causing the galvanometer to deflect.

Commercial Form of the System

The equipment supplied consists of four parts as follows: (A layout view of the system is shown in Figure 10.)

1. The detector roll

This is a roll 4 in. in diameter and 12 in. long mounted on a spring loaded bracket which is in turn mounted on a bar across the machine. This bar is equipped with journals and a lever by which the detector roll can be swung up out of the way when bringing paper across the machine. The under side of the whole assembly is smooth and free from any obstructions which might catch the paper and cause jamming (See Figures 11 and 12). Isolantite is used for roll insulation, being superior in both mechanical and electrical properties to any other material which has been found.

While there is a voltage of from 45 to 90 volts between detector roll and ground under normal operation, the resistances are so high in comparison to normal body resistance (100,000 ohms or less) that anyone touching the detector roll immediately causes the potential to drop to less than .05 volts. The detector roll, therefore, creates no electrical hazard.

2. The instrument

The instrument, of the balanced Wheatstone bridge type, provides both a continuous record on a 12-in. strip chart and a large indicating scale. Since the calibration varies for different papers the chart and scale as furnished are arbitrarily graduated 0-100. Once the correct moisture calibration is obtained, a scale graduated directly in moisture content can be supplied. Where ordered, the instrument can be equipped with electrical contacts to signal high and low moisture.

3. The power unit

The power unit is the heart of the measuring circuit, containing the bridge arms, the necessary current supply for the bridge, and the vacuum tube amplifier. The power unit in conjunction with the recorder forms a self balancing bridge circuit which is not affected by variations in line voltage. The bridge is also isolated from the supply line so that no feed back of line disturbances into the bridge can occur.

4. The cabinet

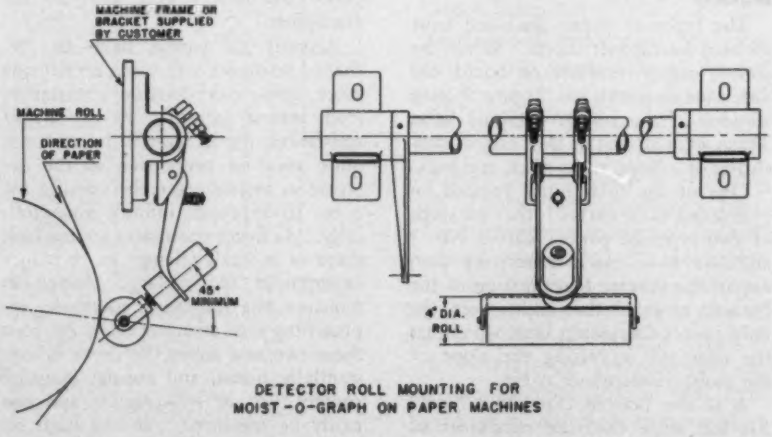
A splashproof cabinet (Figure 13) for housing the recorder and power unit is supplied and greatly facilitates installation and maintenance.

Detector Roll Location

The ideal location for the detector roll is on the last dryer roll. It is least likely to cause jams and is, in general, more out of the way in this location than any other. Then, too, the paper is warm and the resistance is lower and more stable which produces a wider and more accurate moisture range for the instrument.

However, this location is not practical on many machines because of the upper felt being in the way or because of water boxes and additional drying in the calender stacks.

Placing the detector roll on the last bottom dryer is often a simple means of overcoming the problem of the top felt. This location is not suitable, however, if excessive steaming of the paper occurs at this point as a large quantity of vapor condensing on the detector roll insulators may cause leakage which will upset the calibration. The leakage path across the insulators



DETECTOR ROLL MOUNTING FOR MOIST-O-GRAPH ON PAPER MACHINES

FIG. 11

is long enough to prevent any normal amount of vapor from causing trouble.

A third possible location for the detector roll is the calender stack. There are two reasons why this is not generally acceptable. The assembly is usually in the way at this location and may cause jams or a working hazard. Secondly, many papers are sent straight through the stack with a single nip. In this case there would be no machine roll surface to complete the contact and the instrument would be useless on these papers. If it were not for these two reasons this location would be considered perfect with respect to the instrument operation.

Idler rolls are also a very good point of measurement. Such a roll may be located either before or after the calender stack. There should be at least thirty geometrical degrees of wrap both

Figure 12

before and after the point of detector roll contact in order to insure good contact and to prevent any whip in the paper lifting the detector roll up from the machine roll. Functionally, the instrument performs as well here as in other locations.

The detector roll of course may be moved back along the dryer, the machine construction permitting, to such a point where the moisture exceeds the range of the instrument. Since the final moisture is generally the most important factor such a procedure is mentioned as being of interest only for special applications.

Multiple Roll Installations

A single detector roll will only indicate the moisture across 12 in. of the width of the sheet. In many cases it is desirable to check the moisture at several points across the sheet. It is possible to do this by moving the one roll, or by several rolls spaced across the sheet and switched into the circuit. The moving of the single roll presents several mechanical difficulties such as the long threaded rod required, support of such a rod, track for the detector roll, etc.

It is a much more simple and less expensive procedure to place several detector rolls across the sheet and switch them into the measuring circuit. The switch may be hand operated with signal lights in the circuit to indicate which roll is being recorded.

A multiple record instrument is not recommended for this application as the cycling nature of the record produces such a confusion of points that little information can be obtained from the record.

The detector rolls may also be hooked up in parallel and a mean reading of the sheet obtained. This will not be an average moisture reading because any wet streak will greatly lower the resistance and the instrument will, therefore, tend to indicate the wettest point in the sheet rather than the average. Such an arrangement would have its greatest advantage for detecting occasional wet spots which come through.

Automatic Control of Moisture Content

The primary aim to date has been to develop and perfect a system for accu-

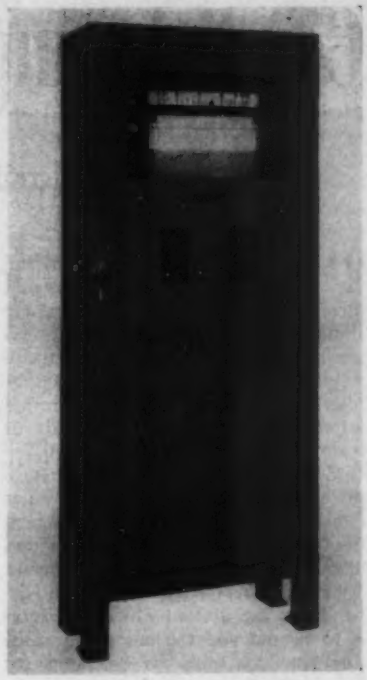


Figure 13

rately measuring, indicating and recording moisture content of paper. No attempt was made to carry the development of control along with the measuring system since the latter presented a very sizable undertaking in itself.

Automatic control of paper drying is at first thought a straightforward problem but such a control, to operate correctly, must take into account all of the factors present in the process. The problem is therefore complex and must be analyzed fully in developing such a system.

Although work is progressing in the development of control, the Brown Moist-o-Graph must, at this time, be considered as a recording and/or signalling device. These instruments will be easily adapted to automatic control at such time as it is available.

Conditioning Water *for the Paper Mill*

I—Water Clarification—Turbidity and Color Removal

ESKEL NORDELL
Technical Department
The Permutit Company

▸▸▸ PULP AND PAPER MILLS use very large quantities of water, therefore, they must be situated where abundant and unfailing water supplies are available. These may be surface supplies, drawn from rivers, lakes or reservoirs, or they may be ground water supplies drawn from wells or springs.

Whatever the source, the water supply contains impurities, for pure water is not found in nature. These impurities may be soluble or insoluble and may be mineral, organic or gaseous. Whether they are harmful or not depends on the uses to which the water is to be put and the amount of each impurity that may be tolerated for each particular use.

In pulp and paper mills, water is used for many purposes, such as making steam, cooling condensers, making liquors, washing pulp, diluting stock, making size, bleaching, in the showers, etc. Then, too, different fibrous raw materials may be employed and different processes used for reducing these to pulp. Wood, for instance, may be reduced to pulp by the groundwood process, the sulphite process, the sulphate process, or the soda process.

Certain water impurities, such as mud or silt, would be objectionable for practically all of these uses. Others would be objectionable only for certain uses. Tolerances, also, would differ not only with the particular use of the water but also with the different products being produced.

If impurities are present in harmful amounts, the water should be treated so as to remove them or reduce them to allowable limits. This may involve treatment of all of the water, treatment of part of the water and/or different treatments of portions of the water for different parts of the mill.

In considering water treatment, it is convenient to consider (1) the forms of treatment used to clarify turbid and/or colored waters, and (2) the forms of treatment required with a water that is naturally clear or which has become so through treatment.

Sediment and Turbidity

Both sediment and suspended matter, usually known as turbidity, are objectionable for such obvious reasons that it is unnecessary to detail them. Sediment is the term usually applied to the relatively coarse and easily settleable mud, sand or silt found in water. Turbidity or suspended matter are the terms usually applied to the finely divided, semi-colloidal or colloidal matter found in water. Frequently, however, no differentiation is drawn between sediment and suspended matter and the two are lumped together and measured as turbidity.

Sediment and turbidity are common in surface waters, while deep wells are usually free from them. In the case of rapidly flowing streams, the sediment and turbidity vary greatly with the seasons and the amount of rainfall, frequently changing many fold in only a few hours. In the case of large ponds, lakes or reservoirs, the water for the greater part of the time, may be relatively free from turbidity, but after a storm or at times of the spring or fall turnovers (due to temperature changes), such waters may become very turbid.

Tentative standards for turbidity, as proposed by TAPPI are: less than 10 ppm for high grade products and not over 25 ppm for low grade products.

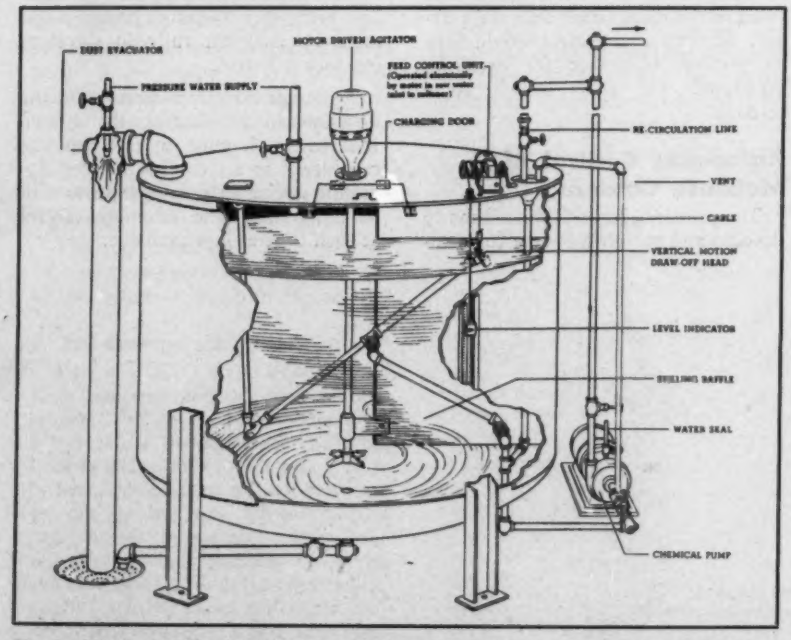


Fig. 1—Solution-type chemical feed. For feeding either solutions or suspension of chemicals.

Color and Organic Matter

The organic impurities which are found in water supplies consist of soluble or colloidal matter derived from decaying organic matter and usually evident as color, and living and dead organisms. Organic impurities are commonly found in surface waters and are either absent or low in amount in ground waters. Waters originating in swampy areas are usually highly colored. In such cases, iron and/or manganese are also frequently present either in an organic or colloidal form.

Color is objectionable in the mill water supply because it is absorbed by and discolors cellulose, thus adversely affecting its color and brightness. The measurement of color is based on a comparison with an arbitrary scale of color standards and results are expressed in reference to these standards as ppm. TAPPI has suggested tentative color tolerances as 0 to 5 ppm for high grade products and up to 20 ppm for low grade products.

Organic growths are common in surface waters, in waters whatever their origin, which have been stored in open reservoirs, and in re-used waters. Algae, fungi, crenothrix, beggiatoa, slimes and other organic growths may cause stains, spots, pinholes, discolorations, tastes, and odors in the finished product and also may cause clogging of pipes, pumps and recirculation equipment.

Some of these may be troublesome only in the warm summer months and may practically disappear during the rest of the year. Others may be more or less troublesome at all seasons.

Briefly, algae grow in relatively quiescent waters, exposed to sunlight. Copper sulphate and chlorine are used to kill them, and covered reservoirs are frequently provided to discourage their growth. Fungi tend to grow on moist organic material which also furnish food, such as pulp.

The term "crenothrix," strictly speaking, should be applied to only a certain limited number of iron and manganese bacteria, but popularly it is applied to all of them and there are over 40 varieties known. These iron and manganese bacteria grow in tanks, pipe lines, etc., in which iron or manganese bearing waters are used. They form brownish (iron), or grayish, or black (manganese) growths which tend to clog pipe lines and pumps and often break loose in large masses. Removing the iron or manganese from the water usually cures these "crenothrix" troubles.

Beggiatoa are probably the best known of the sulphur bacteria, although there are a number of others. They usually form whitish deposits which contain sulphur. Removal of hydrogen sulphide, and chlorination will kill these growths. Slimes and other bacterial growths may be killed by chlorine, chloramine or other sterilizing agents.

Sedimentation

If the water supply is drawn from a swiftly flowing river containing large amounts of coarse, easily settled sediment, sedimentation before coagulation often will result in savings of coagulant. Sedimentation may be accomplished in sedimentation basins or reservoirs.

If sedimentation basins or tanks are employed, they should be designed so that the velocity of the water through them is low, and they should be baffled so as to prevent short circuiting. Means for removing the accumulations of sediment also should be provided.

As to the detention period required, this is best determined by quantitative experiments on the particular water to be handled. In practice, this varies from several hours in the case of tanks or basins up to, in the case of reservoirs, several days to one or more months. In the latter case, of course, since the velocity of the water is extremely slow, the refinements used in the smaller tanks or basins are not employed.

Except in the case of extremely long detention periods, sedimentation usually does not accomplish a thorough clarification of the water, and, therefore, it is to be regarded as simply a preliminary treatment for waters of the nature described. For thorough clarification, coagulation followed by settling and filtration is usually required.

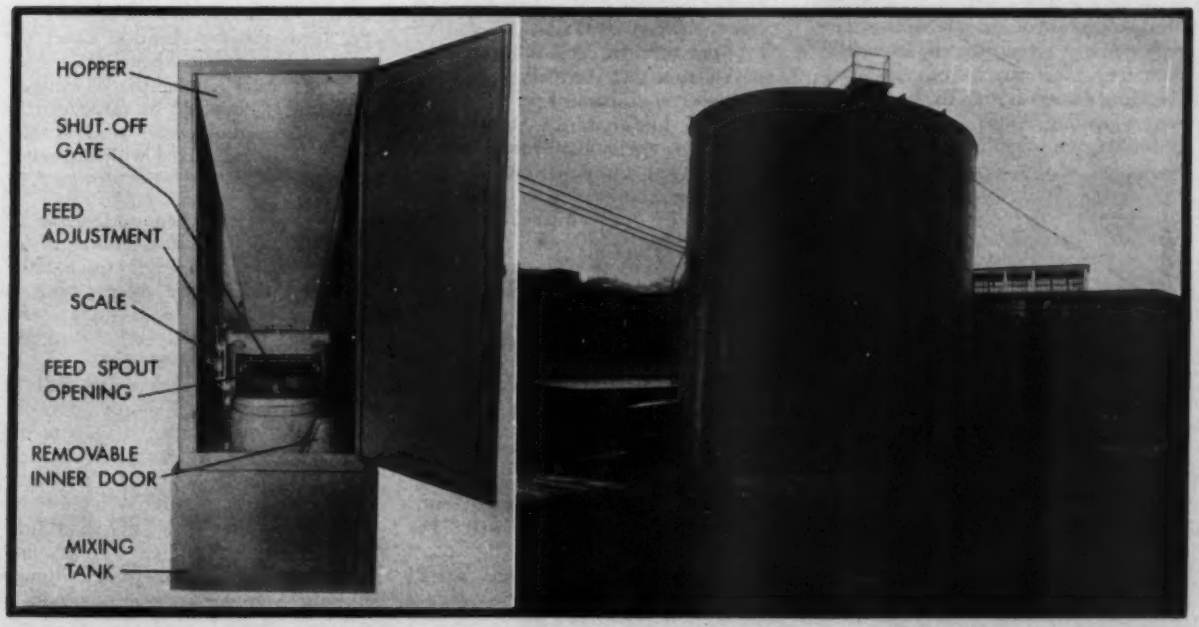
Coagulation and Settling

Coagulation is practiced for the removal of very finely divided suspended matter and color. It consists of adding to the water a substance, known as a coagulant, which reacts either with the natural alkalinity of the water or with added alkalinity to produce a gelatinous precipitate which enmeshes or adsorbs the turbidity or color producing larger aggregations, known as the "floc," which may then be removed by settling and filtration.

The most widely-used coagulant is aluminum sulphate, commonly, though erroneously, called "filter alum." Other coagulants are aluminum chloride, ferric sulphate, ferrous sulphate, "chlorinated copperas," and sodium aluminate. When ferrous salts are employed, they must be oxidized, either by air or by some other oxidizing agent, to the ferric form in order to ensure their complete removal. In general, iron coagulants are not favored for treating the water for paper mills.

For efficient coagulation, it is necessary to maintain the *p*H value of the water within a certain range. Broadly, sulphate of alumina coagulates well between *p*H values ranging from about 5 to 7. The optimum *p*H value for each surface water supply is best determined locally. The waters that coagulate most readily are those which consistently show an appreciable amount of turbidity and also contain

Fig. 2 (left)—Dry-type chemical feed. Fig. 3 (right)—Settling tank.



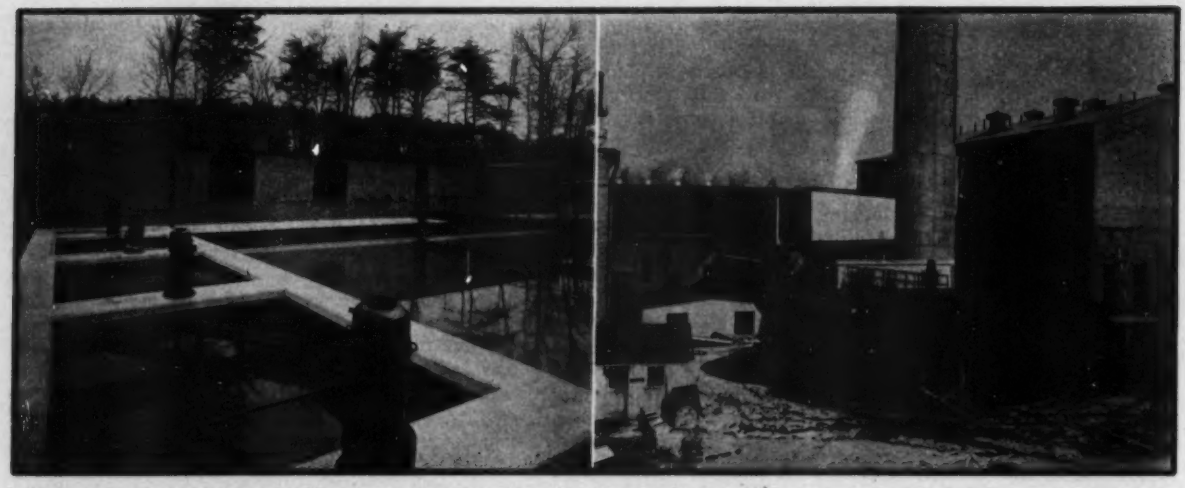


Fig. 4 (left)—Floc-former and settling basin. Fig. 5 (right)—Precipitator for coagulation and settling.

appreciable amounts of dissolved mineral matter. Waters which are high in color and low in turbidity and dissolved mineral matter are the ones which are most difficult to coagulate.

In addition to maintaining the correct range of *p*H values, properly carried out mechanical agitation is of great importance in forming a tough and easily settled floc. Variable speed agitators are of value in this connection as their use enables adjustment of speed of agitation to obtain the best flocculation under all conditions. Correct agitation also broadens the range of *p*H values under which good coagulation may be obtained and effects notable savings in the amounts of chemicals used.

This broadening of the *p*H range is of particularly great value with those waters which otherwise would coagulate only within a very narrow range because control of the *p*H over a narrow range is very difficult, especially with a surface supply of constantly changing composition. In the case of waters having high color and low turbidity, and dissolved mineral contents, the addition of clay has been found very effective in producing good coagulation and an easily settled floc. Various clays vary in value for this purpose; also the clay should not be too finely powdered.

Chemical Feeds

In this connection, the value of reliable chemical feeding equipment cannot be overstressed. The time-honored device of hanging a bag of alum at the entrance end of the settling basin can not be recommended, as it is haphazard in feeding; it rarely effects even an approximately good coagulation and is extremely wasteful of chemical. Instead, a chemical feed which adds accurately measured and easily adjusted dosages of chemicals, should be employed.

Various types of chemical feeds are employed, and these may be divided into the broad classifications—*wet* feeds and *dry* feeds. In the wet-type feeds, the chemical is fed in the form of either an aqueous solution or suspension. In the dry-type feeds, the chemical is fed in dry form.

Chemical feeds are further classified as constant feed or proportionating feed types. The former are employed when the flow of water to be treated is at a constant rate, and this type of feed is connected so that the feeding of the chemical starts and stops simultaneously with the starting and stopping of the flow of water. The proportionating type of feed is employed when the flow of water to be treated varies; the feeding of the chemical varying proportionately with the flow rates of the raw water.

A wet type of feed which is applicable to either constant or varying flow rates is illustrated in Figure 1. This feed, known as the electrochemical feed, is electrically connected with a water meter, through which the raw water passes. As each unit volume of water passes through the meter, an electric contact is made which actuates a motor, operating through a reducing gear, so that it rotates a cable drum a definite amount, thus unwinding a cable, connected to a draw-off pipe in a chemical tank containing a definite strength of chemical, and allowing the draw-off pipe to sink a definite depth in the solution and thus draw off a measured volume of chemical solution or suspension. A cam then breaks the circuit, thus stopping the motor until the next unit volume of water has passed through the meter.

Where chemical suspensions, instead of chemical solutions, are to be fed, a constantly rotating agitator in the chemical tank, serves to keep the chemical in even suspension. A simple dial adjustment is employed so that the dosage, for each unit volume of water passing the meter, can be increased or decreased whenever required. This same type of feed can be employed for constant flow rates, in which case no connection to a meter is employed, but, instead, the feed is so arranged that the cable slowly unwinds at a uniform rate and the feed starts and stops synchronously with the starting and stopping of the flow of raw water.

Figure 2 illustrates a dry-type chemical feed which also can be used for either constant or varying flow rates. In this feed, the dry chemical—alum, soda ash, hydrated lime or materials such as clay or activated carbon—is charged into the hopper, and an oscillating plate at the bottom of the hopper feeds the dry chemical either directly into the water being treated or into a small funnel-shaped mixer, where it is dissolved or suspended in a small stream of water, which is then pumped to and mixed with the water to be treated.

The amount of chemical fed may be increased or diminished by simple adjustments of the feeding mechanism. This type of feed may be arranged so as to operate either as a constant rate feed or as a proportionating feed. In the first case, it is connected so as to operate at a constant speed and to start or stop synchronously with the starting or stopping of the flow of the water. In the latter case, it is electrically connected to the raw water meter so that a definite number of oscillations are made and a definite dosage of chemical fed for each unit volume of water that passes through the meter.

Settling Tanks and Basins

Precipitators, floc-formers, and settling tanks are employed for two purposes: (1) to allow a sufficient detention period to allow coagulation reactions to go to completion with the formation of a large, tough floc, and (2) to settle out the bulk of the floc, thus relieving the load on the filters and permitting much longer filtration runs between backwashings. Settling tanks or basins represent the older types of equipment, while the floc-formers and precipitators represent later developments.

Settling tanks are made of wood or steel and are usually above ground level. Settling basins are made of concrete and are usually partly or wholly under ground level. In designing these, use is made of baffles so as to direct the slow flow of the water through them and thus avoid short-circuiting.

Figure 3 is an installation view of the old type of steel settling basin. The chemical feeds are situated at ground level, and the chemical solutions are pumped from there to the top of the settling tank and discharged into the top of the downcomer, where they are mixed with the incoming raw water. Mixing is accomplished either with baffles or a paddle-type agitator, the blades of which are situated on a vertical shaft between sets of stators fixed to the downcomer.

The flow of the water is downward to the lower edge of the downcomer where the flow is reversed, and the water rises through the space between the downcomer and settling tank to the draw-off collector situated in the upper portion of the settling tank. The precipitates formed collect in the bottom of the settling tank, from which they are discharged through a sludge collector system either periodically or continuously.

The settled water then passes to the filters where final clarification is effected. Backwashing of the filters may be effected with settled water from the top of the settling tank or with clarified water from the filters.

Floc-Formers

A later development, the floc-former, is illustrated in Figure 4. In this installation, the floc-former compartments are on the left hand side and the settling basin is on the right hand side.

The raw water, on entering the first chamber of the floc-former, is thoroughly mixed with the chemicals from the chemical feeds which may be situated either at ground level and the chemicals pumped to the floc-former, or on top of the floc-former and the chemicals discharged directly into it.

The treated water then flows successively through the other floc-former chambers each of which is fittted with agitators rotating at a speed which is controlled so as to furnish a gently agitated rolling mix. The speed of agitation is controlled so as to yield a large, tough and easily settled floc. Too low a speed of agitation results in a poorly formed floc, while too high a speed tends to break up the floc particles.

From the last of the floc-former compartments, the coagulated water enters a baffled settling basin where the bulk of the floc, plus its load of entrained turbidity and color, settles to the bottom from which it is discharged through a sludge removal system. Final clarification is effected in filters, following the settling basin.

Precipitators

The latest type of coagulating and settling equipment is represented by the precipitator as illustrated in Figure 5 which is a construction view of a steel precipitator installation for removing turbidity and color from a very turbid river water. In this, the raw water enters the central mixing section where the chemical is introduced, mixed with the water, and a large, tough floc is produced by the controlled agitation as the water passes downwardly through it.

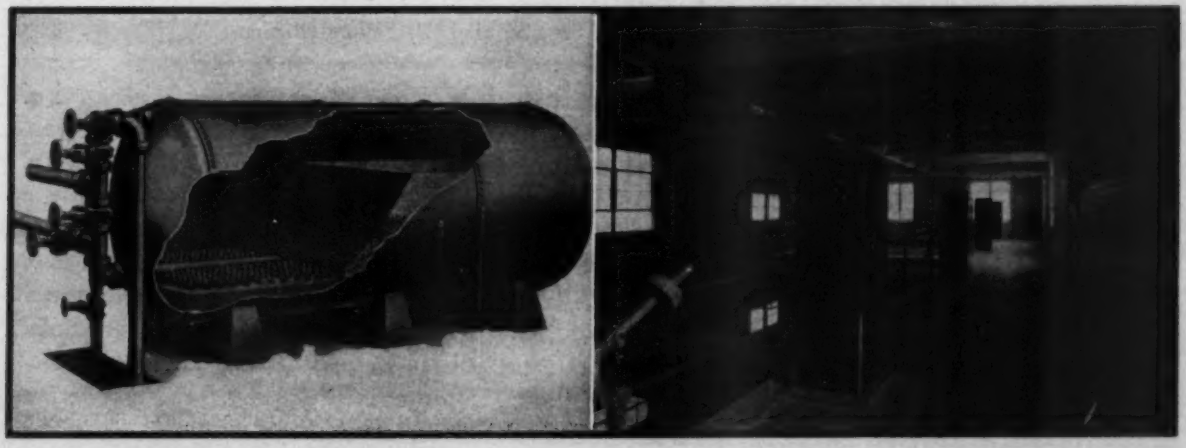
Emerging through ports in the bottom of this inner section, the water then rises and is settled and filtered through a predetermined depth of previously formed sludge in the outer section which is so designed that the cross-sectional area increases steadily from bottom to top. The increasing cross-sectional area results in decreasing steadily the vertical velocity of the water as it rises from the bottom to the draw-off trough in the upper part of this chamber. This decreasing upward velocity results in the water reaching a plane at which its velocity is so low that it leaves the sludge behind and, in practice, this is found to constitute a clean line of demarcation between the sludge and the settled water.

Due to the intimate contact of the water with the precipitates, afforded in this type of equipment, the maximum adsorptive and straining effect of the coagulum is fully utilized. While the detention periods in the old types of settling tanks and basins were usually from four to six hours, the detention period in the precipitator (due to its high efficiency), is only one hour. Therefore, the ground space occupied by the precipitator need be only a fraction of that required for the older types of equipment. Where required, the settled effluent from the precipitator may be further clarified by passing it through filters.

Filters

Sand filters usually are employed following the coagulation and the settling processes. Their function is to remove any insoluble material which

Fig. 6 (left)—Horizontal-type pressure filter. Fig. 7 (right)—Automatic gravity-type filters.



has not settled out of the coagulated and settled water and thus furnish a clear, clean, bright and colorless effluent.

The filter medium that is most widely employed is sand, hence the name sand filter. During the last decade, however, crushed and graded anthracite has come into favor as a filter medium.

Due to the use of coagulants, the old English or slow sand filter has practically disappeared and has been replaced by the American or rapid rate filter. These may be divided into two classifications—the *pressure* type and the *gravity* type. In the pressure type, the container for the filter media is a closed steel shell designed for whatever pressures are required. In the gravity type, the container for the filter media is an open concrete, wood, or steel shell.

Figure 6 illustrates a horizontal pressure-type sand filter. The standard diameter for these shells is 8 feet and they vary in length up to 25 feet. Where smaller flow rates are to be accommodated, vertical shells are employed varying up to a maximum of 10 feet in diameter. At the bottom of the filter is an underdrain system which serves the double purpose of acting as a collector for the filtered water on the filter run, and as a distributor for the backwash water when the filter unit is cleaned by backwashing.

Over this underdrain system lie several layers of graded gravel, the coarsest at the bottom and the finest at the top; then a layer of coarse sand; and on this a layer of fine filter sand. Typical specifications are:

Fine Sand	12 inches
Coarse Sand	10 inches
Gravel (¼"x⅛")	4 inches
Gravel (½"x¼")	4 inches
Gravel (1"x½")	8 inches
Gravel (1½"x1")	4 inches

During filtration, the water under pressure enters the upper part of the filter through a distributor, slowly passes down through the layer of fine filter sand, then the coarse sand and supporting layers of gravel and into the underdrain system from which it flows to service. The filtration action is performed on the surface and in the upper layers of fine filter sand.

As filtration proceeds, the layer of coagulated matter which collects in the filter, grows thicker and, as it does so, it exerts an increasing resistance to the flow of water through it. This resistance is shown by pressure gauges on the inlet and outlet of the filter, and when this pressure differential reaches some 4 to 5 lb. per square inch, the filter unit is cut out of service and backwashed.

Backwashing is performed by sending a strong stream of water through the underdrain system, upwardly through the gravel and sand layers and out to the drain. This upward flow expands the filter bed, cleanses the sand granules, and washes the accumulated foreign matter up and out of the filter bed to the drain. Backwashing should be performed at a flow rate of not less than 10 g.p.m. per square foot of filter area and flow rates from 50 per cent to 100 per cent higher are often employed.

Backwash rates really should be measured by the expansion of the filter bed rather than by the number of g.p.m. per square foot of bed area because the expansion of the bed is of primary importance. This expansion varies not only with the backwash rate, but also with the viscosity of the water. Naturally, the lower the temperature of the water, the higher the viscosity. Therefore, if a given backwash rate is satisfactory when the temperature of the water is 40 Fahr., it may not be at all satisfactory when the temperature of the water is 70 or 80 Fahr.

Backwashing usually is carried out for about ten minutes. After backwashing, the filter unit is then rinsed to waste for a few minutes so as to settle the bed and build up a small layer of coagulated matter on and in the upper layers of the filter sand.

Filters are usually supplied in batteries of two or more units so that, while one unit is out for backwashing and rewashing, the other unit or units can carry the full load. Provision also must be made for supplying the backwash water at whatever rate is required. Turbid water is not suitable for backwashing because it fouls the filter bed. Settled water sometimes may be employed. Filtered water often is used for backwashing and may be supplied by gravity from an elevated storage tank, or by a backwash pump from a clear well. Backwashing one filter unit with filtered water from the other units is also employed, occasionally, but this plan means that the full filtering service of at least three units is required in order to backwash one unit.

Figure 7 illustrates concrete gravity-type sand filters. Wood and steel shells are employed occasionally for gravity filters, but usually the shell is made of concrete and also in the form of a rectangular box. Gravity filter units are almost invariably mounted so as to discharge into a clear well, from which the water is pumped to service —the well also serving to supply filtered water for backwashing.

While the gravity filter differs in details of design from pressure filters, the principles and the methods of operation are much the same. With gravity filters, however, backwashing is performed following the building up of a much lower pressure differential. Except for these differences, the operation and results obtained with gravity filters are so similar to those with pressure filters that a more detailed description is unnecessary.

Coagulation, settling, and filtration, when properly carried out, will remove turbidity, color, colloidal suspensions, organic iron and/or manganese, and will effect large reductions in microorganisms. These processes however do not remove soluble mineral matter and, therefore, the hardness content of a water is just as great after as before filtration.

EDITOR'S NOTE: This article is in three parts. The two remaining installments will be published in subsequent issues of this magazine.

TROUBLE *on the Paper Machine*

IV—CALENDERS

ARCHIE McCAFFERY

▸▸▸ BABBITT-LINED CALENDER BOXES, if kept comparatively cool, will give satisfactory performance. On the other hand, if such *boxes* once *become hot* and the babbitt starts to flow, they always will run hot. Perhaps, the outer ends of such boxes look as they always did, but the entire lining surface has been made rough by the melted babbitt.

There is nothing that can be done to correct a difficulty of this kind except to take out the boxes which are heating and install newly-lined ones. Often it will be found when removing such boxes that they will have to be pounded to get them off the journals. The only way to avoid trouble of this kind is to keep the boxes from getting hot.

There are times, however, when such boxes cannot be kept cool. Nevertheless, it would seem that an attempt would be made to guard against such trouble by providing ample water pressure and an abundance of lubrication for such boxes.

The method of getting oil into some boxes of this kind is to provide an individual oil hole at the top of each box, and, on the interior of the top lining, cut a channel lengthwise of the box. The lower box, in a case of this kind, collects the grime that drips down from the box above. This grime soon fills the channel so that no oil can find its way out on either side of the oil hole. The result is a hot box, the babbitt melting in such a way as to eliminate the channel.

When calender boxes are packed with grease, there is no opening through which grime can find its way into the boxes. Then too, if a box is brass lined and the box has become hot, but not hot enough to cut and fill the channel, the use of plenty of oil will cool it down with little or no injury to the lining.

Usually, calender boxes are changed at a time when the machine is down and the machine help is busy at the wet end, changing felts, washing up or doing other work. Therefore, the machine crew does not see the interior of the boxes, and probably receives no information pertaining to their condition.

Machine help should be taught the effect of hot boxes on cost of production and how to minimize their occurrence. The cost of changing one or two boxes is not a big item in itself. The more important cost is the loss in culled rolls—rolls which cannot be shipped.

The more modern calender boxes are equipped with roller bearings and are so lubricated that they are not susceptible to the conditions which cause the older type boxes to heat.

Sometimes the *piping system* supplying cooling water to the calender boxes *plugs*. Although the job of locating the cause of the plugging and removing it belongs to pipe maintenance, it may be necessary for this work to be done by the machine crew, particularly if the trouble occurs during the night.

Seldom does a pipe plug all at once. If there is simply a lowering of pressure, the condition may be aided somewhat by shutting off all unused fittings at the wet end.

Often machine tenders leave the hose running at the wet end. Under normal conditions, this practice may be all right; but, when the pressure of the water at the calenders is low, it is better to shut off the hose.

A machine tender should have a kit of tools of his own to make minor repairs. The kit need not be expensive. Only such tools and material as needed should be kept on hand. If the machine tender follows this suggestion, he will save himself time and money for his employer.

Borrowing tools, such as pipe wrenches, hammers, pinch bars, or bolt wrenches, is poor business.

Sometimes the *edges of* a *sheet* may be of *unequal distance from* the *ends of* the *calender rolls*. This condition may be caused by a machine that is improperly set up or by faulty draws of the sheet or clothing. Whatever the cause, it must be ascertained and the condition remedied; otherwise the reel will run up slabsided.

When the end roll of a first felt, the roll that follows beneath a press felt, is used for the stretch, and it is unevenly tightened to make up for a shell in some other roll that is worn, the *sheet* will *skid* over *to* the *side of* the *machine* in which the distance of the roll is less great—perhaps an inch. Then, too, the shell of one of the bottom boxes of the third press may be worn so that it lets down both rolls, causing the paper roll above on that side of the machine to be pitched forward, not sufficient to cause a bad draw, but enough so that the *sheet creeps* to the same side about one-half inch. Also, where there is a dryer felt stretch beneath the lead dryer or smoother rolls, and this *stretch* is being kept *out of distance* to keep on the felt, it *will pull* the *sheet to* the *high side*,

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Babbitt-lined calender boxes • Boxes become hot • Piping system plugs Sheet winds around calender roll, plugs the stack . . . pinches on edges Edges of sheet unequal distance from ends of calender rolls • Sheet skids to side of machine • Sheet cut in stack • Sheet pinching on the edge Sheet guided over to one side of stack • Cracked press roll may fill sheet with cracks • Stretch out of distance will pull sheet to high side Paper snap off at calenders • Calender rolls crowd . . . coat with spots Calender doctors do not always fit • Calender roll marked by plugging Packing blows out of one of steam rolls in calenders • Dents must be kept out of surface of baby water roll • Uneven expansion with steam-heated roll

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possibly another inch. If this creepage was all in the same direction, it would mean that the sheet would be two and one-half inches to one side from its normal position.

If the machine normally had four inches of calenders on each side of the sheet, this condition would position the sheet so that there would be six and one-half inches on one side of the calenders and one and one-half inches on the other—a situation which is enough to cause any reel to be slab-sided.

To correct the difficulty, the felt rolls would have to be redistanced; the press roll shelled; and the stretch of the dryer felt leveled.

A *sheet* will *cut in* any *stack* unless it is drawn tightly. Where water is run on the sheet, the paper must be drawn over a shoe; otherwise, it is sure to cut.

Paper may *snap off at* the *calenders* for any one of a number of reasons. Dry calenders and hot rolls in the calenders are causes of this trouble that machine tenders may overlook.

With a belt-driven stack of calenders, running hard because of dry rolls or of a hot roll binding, the belt will slip more than normally. Such rolls will cut; and, to avoid the cutting, the back tender will pull them up. In doing so, however, the rolls will not run steady since the belt keeps taking hold and letting go. If the calenders are pulled up enough to prevent cutting, everything that comes along in the edge of the sheet will snap off the paper. True enough, there may be some little defect on the edge of the sheet where it has broken, but the break would not have occurred if the sheet could have been drawn slacker without cutting.

Nothing can be done to get out of this difficulty except to give the rolls a good oiling or to cool off the hot box. If this work is done, the belt will haul steadier and the rolls can be slowed back without cutting. The back tender should watch the calender draw when the stack is being oiled to prevent the rolls from running ahead and snapping off the paper.

If a *calender roll* is *marked by plugging*, it is possible that the mark can be removed by rubbing with a piece of emery. If this procedure does not take off the burr, the roll will have to be taken out of the stack and ground.

Some superintendents try to operate a stack of calender rolls too long between grindings. If the rolls are run too long, sooner or later there will be trouble with the *sheet pinching on* the *edges*. A sheet of paper in the calenders does not remain exactly the same width at all times. There are circumstances which will change the width of the sheet as well as the position it takes in running through the stack.

Therefore, machine tenders must be on the alert to keep the sheet running in its accustomed place in the calenders. If this practice is not followed, surely a time will come when the calenders will pinch the edges of the sheet.

A sheet may be full width after a wash up; but, as the felts harden, the paper will shrink in width in the dryers. This condition must be watched for, and, if it develops, the sheet must be widened out. Otherwise, the calender will pinch sooner or later.

If the stretch roll in a first felt is on the end, and it has been necessary to put out of distance, the sheet will have to be pushed in on one side and pulled out on the other. Otherwise, the sheet, which has skidded over to one side will be pinched on one edge in the calenders. The reason for the pinching is the increased diameter of the end areas of the rolls where the sheet is not accustomed to run. The rolls wear down where they contact the paper, and, in consequence, when the paper is forced to run through the stack out of regular position, the rolls pinch the sheet on the side of he lateral movement.

Some dryer felt hook-ups have the stretch roll on the end beneath the lead dryers. This roll, if thrown out of distance, will draw the paper on the machine to the side on which the stretch roll is the higher. The sheet will have to be brought back into position if calender pinching is to be avoided.

Sometimes a sheet is shoved in on account of a narrow wire. If the sheet is run narrow for any length of time, trouble may be expected when the wire is changed and the sheet is widened again.

A *cracked press roll*, which would not cause trouble when a felt is new, *may fill* a *sheet with cracks* when the felt is old. If the cracks are on one end of the roll, the machine tender may narrow up the sheet on that edge by trimming with a water jet on the wire. Operating in this way for an indefinite period of time will affect the calenders but it is a circumstance which cannot always be avoided.

Calender rolls at times will *coat with spots*. On water finish, spotting of rolls is a common thing. Spotting is even more pronounced where the paper is saturated with water. A steam roll in the calenders will spot more than any of the other rolls.

If the spots are left on a calender roll for any length of time, the sheet will stick to and wind around it, causing a break at the calenders. Sometimes a good dose of kerosene will help to remove them. At best, the backtender will be kept busy scraping them off.

Worn boxes will cause *calender rolls* to *crowd;* and crowded rolls, in turn, will cause *bearings* to *overheat*. Likewise, overheating may be due to babbitt which at some time has started to flow or to a poor grade of oil. If bearings run hot, check up on everything, locate the cause and correct the difficulty.

Calender doctors do not always fit. A hot bottom roll may cause the doctor to bother. Whatever the cause, the condition should be reported to the boss machine tender.

If the machine has been shoved in for any length of time and then it is pulled out, the *sheet* is apt to *wind itself around* a *calender roll* and *plug the stack*. It is bad enough on news and other lightweight papers where no water is run against a calender roll, but on water finish, it is worse.

Should the stack plug, the only thing that the backtender can do is to break off the sheet and stop the stack. The sheet then can be cut across and the paper pulled off the roll. A wad of felt soaked in kerosene, if placed against one of the rolls above the water roll, might prevent the sheet from sticking to the water roll. The kerosene would tend to keep the water off the edge of the sheet where it contacts the edge of the water roll which is full. If picking continues, the water roll will have to be taken out and replaced with another roll.

If a *packing blows out of one of the steam rolls in the calenders,* shut off the steam on that roll and get along without it. This procedure will dull the finish of the sheet but it permits the machine to continue in operation.

If the *sheet* has been *guided over to one side of* the *stack*, it can be adjusted readily by shoving in one of the water jets and pulling out the other.

If the paper rolls are wet beyond the limits of the sheet, they should be wiped off with wet broke before widening out the sheet; otherwise, the whole sheet may start to wind around one of them.

When making water finish and running a baby water roll, *dents must be kept out of* the *surface of* the *baby water roll*. Dents in such a roll permit water to get by and to saturate the paper in spots. This saturating of the sheet in spots may cause it to stick to

the calenders or otherwise to mark in a way to make it unsalable.

A water roll may be made in the mill shop from a piece of three inch shaft of suitable length, two shaft stands, a strip of press felt, and some lagging wax. To make the roll, a journal first is turned on each end of the shaft. Then a strip of old press felt about 18 inches wide and of the same length as the roll portion of the shaft is soaked in hot water. After the soaking, such water as can be easily wrung from the felt is squeezed from it. Next the felt is laid flat upon the floor and one lengthwise edge of it is smeared with hot lagging wax.

Then the shaft is laid upon the lagging wax, after which the felt is wound around the mandrel. It is imperative that the felt is kept smooth during the winding and that a tail of about five or six inches long is left at the end. A strip of cheese cloth, the same length as the felt, and which has been soaked in hot water and partly dried, next is laid upon the tail of the felt and the winding operation continued to completion, keeping the surface smooth during the entire process and tearing off the selvage of the cheese cloth when the winding operation is finished. It making the roll, it must be kept in mind that there are right and left hand operations in order to avoid unwinding of the roll when installed on the stack, the stands, not unlike those of the spring roll being used to attach the roll to the calender frame.

A rubber-covered baby roll does a better job of distributing water than the roll just described. The mill-made roll will leave the impression of the end of the cheese cloth covering in the sheet with every rotation. The rubber-covered roll, on the other hand, leaves no such impression. The mill-made roll, however, has an advantage not possessed by the rubber-covered roll in that it can be rebuilt easily on the job in case of necessity whereas the other roll cannot.

Calender rolls, if everything around them is normal, should calender the paper without much assistance from the air or wrapper pads. There are some calenders, however, which must have attention all of the time if an even reel is to be made. Behind some of this trouble is the fact that calender rolls are ground cold and run hot. If trouble with *unexen expansion* is experienced *with* a *steam-heated roll*, the remedy is to grind it under steam pressure.

EDITOR'S NOTE: This series will be continued. Previous to this issue, the following installments have appeared in this magazine: I—Fourdrinier Part in June; II—Press Section in July; and III—Dryers in August.

NOTES FOR THE MILL MAN

W. F. SCHAPHORST, M. E.

Treat Belt Before Shutting Down

▶▶▶ MOST USERS OF BELTS make the serious error of waiting for a belt to slip before applying dressing or treatment. And then when they do apply dressing they are liable to apply so much that the belt will fail to pull properly for some time on account of the interval required for the belt to absorb the dressing, especially if the dressing is of the liquid type.

For example, the author knows of an instance where a 600 hp. engine was laid up for nearly one-half of a day, because the engineer applied too much treatment to the belt while it was in use. It was only after much wiping and cleaning that the belt was finally brought to a good tractive condition.

A belt is at its best when it is well filled with treatment, and when the surface is nice and soft and pliable. If it is a main drive belt, the proper time to treat it is just before shutting down for the night or for some other similar period. If the belt runs on a wrapper pulley or loose pulley part of the time, treat it when it is not working. The treatment will then have ample time to "soak in".

When Making a Belt Joint

▶▶▶ Before making a joint in any belt, it is a good plan first to examine the belt carefully and study the joints already in the belt as made by its manufacturer. Then make the joint as nearly like the manufacturer's joint as possible.

Also, when cutting a belt, the *first* rule, and a very important one, is to cut the belt *square*—at absolute right angles with the outer edges. Do not attempt to do this most important job with the eye alone. Many valuable belts are ruined annually because this seemingly small point is ignored. Its importance can hardly be over-emphasized. Always use a square, and do the cutting while the square is in position.

Unless cut perfectly square, it is obvious that one part of the belt will be under greater tension than other parts of the belt. As a result, fasteners are likely to pull out; the belt may run from side to side on the pulleys, perhaps even running off frequently; and, if a fabric belt, the belt is apt to split.

Belt cutters are now to be had on the market which assure cutting the belt perfectly square. In mills where many belts are used, these cutters are a great convenience and an economy factor. And the same is true of machines that automatically lace belts together, perfectly square. Machines of that type also, are available on the market.

Cold Water Breaks Hot Slag

▶▶▶ It has been demonstrated to the author's satisfaction that where slag forms and bakes onto the lower row of tubes of water tube boilers, as it often does, cold water is an excellent agent for its removal. It is far better than steam, which is commonly used, since it causes the slag to crack and fall off in large pieces.

During a cleaning demonstration the temperature of the flue gases was reduced approximately 15 degrees, the cold water being introduced into the boiler and onto the hot slag by means of an old-fashioned hand lance. Now the cleaning is done while the boilers are in operation.

Freeing the tubes of slag increases the chimney draft, helps maintain high efficiency, and saves much money due to the time previously required for laying up and cleaning boilers.

Caution:—It is important to exercise care in introducing the cold water so that it will not touch the furnace walls. Cold water on a hot wall will crack the wall as readily as it will crack the slag. Be sure to confine the water to the slag only.

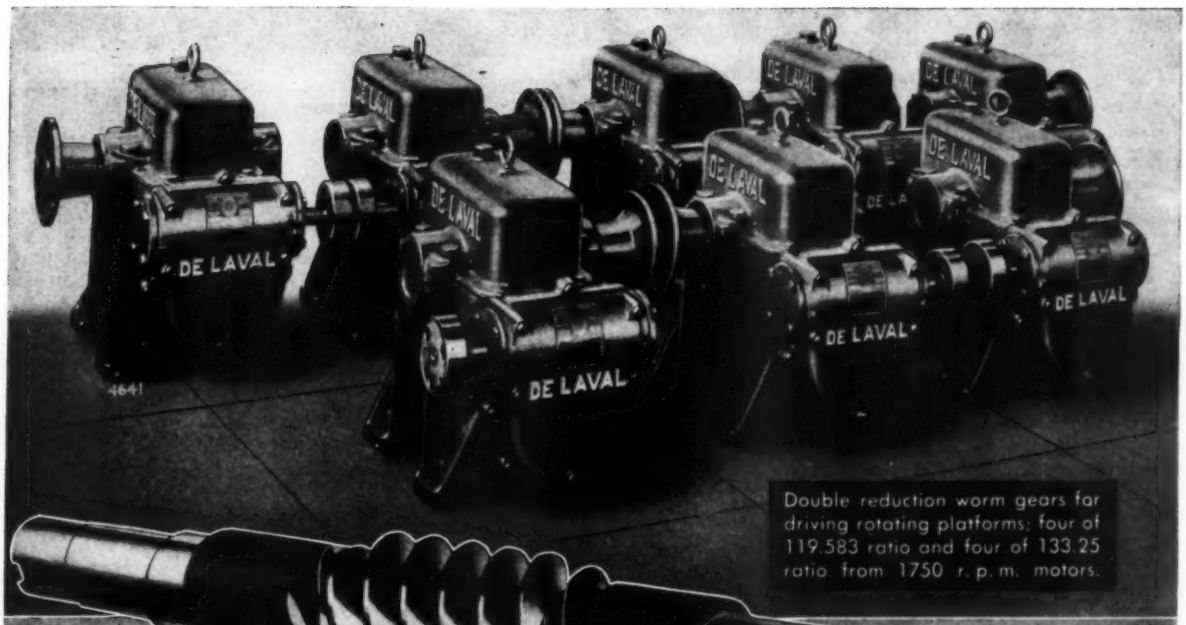
PAPER SKETCHES

IN ORDER TO REDUCE TO A MINIMUM THE WEAR IN THE BARREL OF HIS 6.5 MILLIMETER CALIBRE MANNLICHER RIFLE CAUSED BY THE FRICTION OF A HIGH-SPEED BULLET, COL. RUBIN, SWISS INVENTOR OF THE 1890'S, WRAPPED THE PROJECTILE IN SPECIALLY PREPARED OLEOGINOUS PAPER-

MERRILL RICE, MASTER MACHINIST, PENNSYLVANIA SUGAR COMPANY, AS A HOBBY, MAKES TWO OR THREE VIOLINS ANNUALLY FROM OLD NEWSPAPERS. PROPER THICKNESS AND STRENGTH OF BODY IS OBTAINED BY SHAPING AND LAMINATING ONE SHEET OF NEWSPAPER ON TOP OF ANOTHER, USING FLOUR PASTE AS THE ADHESIVE AND COVERING THE BODY WITH SHELLAC AND VARNISH. CARRYING CASES FOR THE VIOLINS ALSO ARE MADE FROM NEWSPAPERS BY THE HOBBYIST RICE.

ABOUT THE BEGINNING OF THE CHRISTIAN ERA, WHITER AND BETTER PAPYRUS WAS BEING MADE IN ROME THAN IN EGYPT...

IN 1890, BERGEN, NORWAY, HAD A CHURCH CAPABLE OF SEATING 1,000 PEOPLE, THAT WAS MADE OF PAPER! A SOLUTION OF QUICK LIME, CURDLED MILK AND EGG WHITES WAS USED TO RENDER THE PAPER WATERPROOF—



Double reduction worm gears for driving rotating platforms; four of 119.583 ratio and four of 133.25 ratio from 1750 r. p. m. motors.

for smooth, quiet drives

specify DE LAVAL WORM GEARS

The continuous wedging action of the De Laval worm gear transmits power without vibration, shock or noise. • Three or more teeth are always in contact, resulting in an even flow of torque and great strength. • Both motor and driven machine are saved the impact of gear or sprocket teeth. Frequently the product is improved or the machine can be speeded up because of the absolutely uniform motion. Operatives do more and better work when not annoyed by noise and vibration. Describe requirements and ask for Publication W-1129.

Double reduction worm gear with vertical output shaft.

DE LAVAL

WORM GEAR DIVISION

of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES STEAM HYDRAULIC PUMPS CENTRIFUGAL PROPELLER ROTARY DISPLACEMENT MOTOR-MOUNTED MIXED-FLOW CLOGLESS SELF-PRIMING CENTRIFUGAL BLOWERS and COMPRESSORS GEARS WORM HELICAL and FLEXIBLE COUPLINGS

ALLIED

FARREL-B. CO. AWARDS SERVICE PINS & EMBLEMS

Service emblems were awarded last month to 577 employees of the Farrel-Birmingham Company, Inc., Ansonia, Connecticut, and Buffalo, New York, in recognition of continuous service with the company.

Sterling silver pins were given to 139 members of the group to signify the completion of 20 to 25 years of service, while the other 438 were presented with bronze emblems for a 10 to 20 year service period.

A. G. Kessler, vice president and general manager, made the presentations in the Buffalo plant, while at the Ansonia plant it was necessary to dispense with a formal presentation due to the large number of eligible employees. At this plant, the awards were made to each employee through a personal letter from N. W. Pickering, president.

◆

▶▶▶ THE LOCATION of two sales and service branch offices of the Foxboro Company, Foxboro, Massachusetts, has been changed; the new St. Louis (Missouri) branch is located at 3615 Olive Street, and the Cincinnati (Ohio) office at Walnut Street and Central Parkway. E. B. Miller will succeed E. R. Huckman, who has been transferred to a New York territory, as manager of the St. Louis branch with R. H. Hemfelt as assistant. The manager of the Cincinnati office is Yeatman Anderson.

◆

GOODRICH TO BUILD HUGE GOVT. PLANT

The War Department announced recently that the B. F. Goodrich Company, Akron, Ohio, had been selected to direct the construction and operation of a $35,000,000 government ordnance plant to be established near Texarkana, Texas. This job will be carried out by the Lone Star Defense Corporation, organized as a subsidiary of the Goodrich Company, with industrial experts from Goodrich serving in the newly organized company.

The exact location of the huge enterprise, which will serve as a bomb loading unit for the ordnance department, will be 7 miles west of Texarkana on a tract of land comprising 24,300 acres. It is estimated that 8,000 people will be employed to carry out the construction of this new plant.

▶▶▶ APPROXIMATELY $250,000 WILL BE SPENT by the Research Corporation, an affiliate of Reynolds Metals Company, New York, in modernizing and installing machinery in a recently leased building which will be used to manufacture metal-capped paper containers for use in shipping gun powder. The building, which will add 125,000 square feet of manufacturing space to its Louisville (Ky.) plant, was leased from the American Oak Leather Company. The new factory will employ about 200 skilled tube winders, and is expected to begin operations by November 1. This company also maintains one of the largest, modern paper testing laboratories in its field (cf. THE PAPER INDUSTRY AND PAPER WORLD, August, 1941, p. 442).

◆

SERIAL ON FIBRE BOXES REPRINTED

An exceptionally informative, 70-page booklet on the subject "The Manufacture of Fibre Shipping Containers" has just been published by the Board Products Publishing Company, Chicago. This material, written and compiled by A. W. Werner, was first published serially in *Fibre Containers* in 1940 and 1941.

The ten chapter headings are a good index to the comprehensive and detailed treatment given this subject. They are: Requirements and Styles; General Specifications; Paperboard; Tests; Relationship of Tests; Machinery; Adhesives, Waterproofing, and other Coatings; Closures; Samples and Allowances; and the Salesman. Each chapter is subdivided into many more specific subjects. Many diagrams and illustrations are included to supplement the written material.

◆

▶▶▶ DUE TO THE INCREASING DEMAND for sales and engineering service in connection with power and process measurement and control the Bailey Meter Company, Cleveland, Ohio, opened a branch office in Detroit on July 1. Previous to the opening of the new office, this company was represented in this territory by resident engineers. N. M. Barnett will act as manager of the new office, which is located in the Curtis Building, Detroit, Michigan. He will be assisted by R. F. Hanson and R. T. Cowan, both having had wide experience in the engineering field.

▶▶▶ A 101 YEAR OLD CONCERN, the Lyon Iron Works, Greene, New York, announced recently that the company name has been changed to LYON-Raymond Corporaton. It was also stated that this change is in name only, and that the company will continue under the same management, directed by George Raymond, president. Mr. Raymond has served as president since 1922, when he took over Walter L. Lyon's interest in the company.

◆

CHAIN BELT CO. REVIEWS 50 YRS. OF DEVELOPMENT

Starting out as a small organization, the Chain Belt Company, Milwaukee, Wisconsin, celebrated its 50 years of progress on September 9. A special 50th Anniversary issue of *The Rex World* has been sent out reviewing the development of this company during its first half a century of business.

The publication, using illustrations extensively, pictures the business in its beginning stages when only one type of chain belt, which was used on agriculture machinery, was being manufactured, and then pictorially presents many of the developing steps taken by the organization. A number of the vast industries which this company supplies with chain belts are also pictured, exemplifying achievement and development.

◆

▶▶▶ TWENTY-FIVE YEARS in the importing of wood pulp marked the silver anniversary of Pagel, Horton & Company, Inc., New York City. The company was incorporated September 1, 1916. A. J. Pagel is president of the company.

◆

▶▶▶ THE JOHNS-MANVILLE CORPORATION, New York City, completed a contract with the War Department on August 21 which calls for the construction and operation of a $27,000,000 shell-loading plant to be located near Parsons, Kansas. Work on the new plant, which will be known as the Kansas Ordnance Plant, will begin immediately. It is estimated that approximately 8,000 persons will be employed.

◆

▶▶▶ THE STURTEVANT MILL COMPANY, Boston, Massachusetts, announced recently that effective August 1, all types of Poirier Equipment will be manufactured and sold by the Poirier Control Company, Waterville, Maine. It was also stated that the latter company would welcome inquiries concerning the various types of equipment.

MORE for your Value buying Dollar

with LUNKENHEIMER

125 lb. S. P.

BRONZE GATE VALVES

Fig. 2125

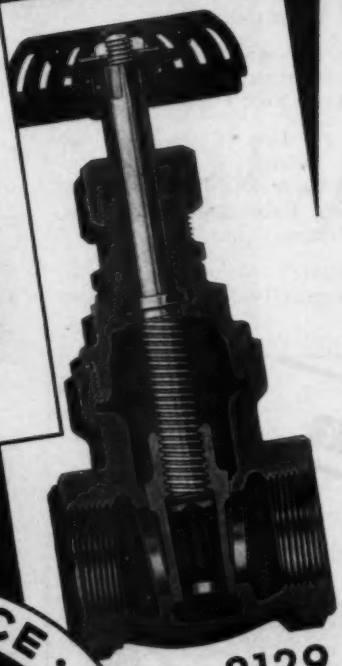


Fig. 2129

You owe it to the profit side of your ledger to try these valves in the many places around your plant where small bronze gates are used.

They'll prove themselves in actual service and give you more for your valve buying dollar as well as your valve maintenance dollar, just as they prove themselves in actual point-by-point comparison, with any other make valve of similar type.

With the many superior features built into Lunkenheimer bronze gate valves —all combining to guard against failure and to promote longer service life —replacements are negligible. You avoid interruptions in service and shutdowns and by using fewer, longer lived valves you help to conserve materials —vital for national defense.

Remember --- you buy fewer valves when you buy Lunkenheimer.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

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For full information on the complete line of Lunkenheimer Valves send for your copy of Catalog 78.

See your local Lunkenheimer distributor. He is cooperating in every way to give you the kind of service you so vitally need for the National Defense program.

ASSOCIATIONS

NAT. DEFENSE TO BE THEME AT CHEMICAL EXPOS.

Problems of national defense together with information on the nation's advance toward self-sufficiency will be the theme of the 18th Exposition of Chemical Industries to be held in New York City, December 1-6, which is expected to be the largest chemical display in 12 years. Although most of the available display space was assigned more than a month ago, applications are still being received from prospective exhibitors.

Besides emphasizing the progress that was made by chemical process industries that were started during the last war, many scientific forecasts will be made concerning post-war future. The exhibits will reflect the increasingly important part that laboratories and pilot plants are playing, not merely in producing new products but also in establishing new industries. It will also be pointed out, as being characteristic of the times, the evolution and marketing of new processes and equipment in the form of complete operative units.

◆

CONVENTIONS AND COMING EVENTS

Sept. 15-17—Fall Convention of National Paper Trade Association, Chicago.

Sept. 16-20—Fall meeting of the Technical Association of the Pulp and Paper Industry, University of Michigan, Ann Arbor, Mich.

Sept. 17-19—Annual Conference of National Industrial Advertisers Association, Royal York Hotel, Toronto.

Sept. 25—First meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association, Kalamazoo, Mich. (See Stated Meetings)

Sept. 26-27—Maine-New Hampshire Section of TAPPI, Orono, Maine.

Oct. 3-4—Pennsylvania-New Jersey-Delaware Division of the American Pulp and Paper Mill Superintendents Association, Ritz Carlton Hotel, Atlantic City, N. J.

Oct. 6-10—Thirtieth Annual Safety Congress of the National Safety Council, Stevens Hotel, Chicago.

Oct. 6-11—Chicago Exposition of Power & Mechanical Engineering, International Amphitheatre, Chicago.

Oct. 10-11—Fall meeting of the Northwestern Division of the American Pulp and Paper Mill Superintendents Association, Northland Hotel, Green Bay, Wis.

Oct. 11-14—National Association of Waste Material Dealers, Inc., San Francisco, Cal.

Oct. 18—Fall meeting of the Connecticut Valley Division of the American Pulp and Paper Mill Superintendents Association, Norwich, Conn.

Oct. 24-25—Southeastern Division of the American Pulp and Paper Mill Superintendents Association, Asheville, N. C.

Dec. 1-6—Eighteenth Exposition of Chemical Industries, Grand Central Palace, New York City.

Jan. 26-30, 1942—Seventh International Heating and Ventilating Exposition, in the Commercial Museum, Philadelphia.

Feb. 16-19, 1942—Annual meeting of the Technical Association of the Pulp and Paper Industry, New York City.

STATED MEETINGS

Technical Association of the Pulp and Paper Industry.

Delaware Valley Section—First Friday of each month—Engineers' Club, Philadelphia.

Kalamazoo Valley Section—First Thursday of each month—Park American Hotel, Kalamazoo, Mich.

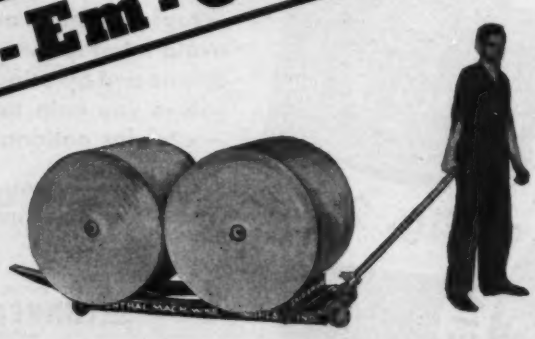
Lake States Section—Second Tuesday of each month—Conway Hotel, Appleton, Wis.

New England Section—Third Friday of each month—Roger Smith Hotel, Holyoke, Mass.

The American Pulp and Paper Mill Superintendents Association.

Michigan Division—Third Thursday of each month—Park American Hotel, Kalamazoo, Mich.

The NEW Skid-Em-On



MODEL PP

Multiple Roll End Loader

Here is a brand new Skid-Em-On dedicated to decreasing roll handling costs in your plant! This new model, combining all the regular features of other Skid-Em-Ons, permits the handling of two rolls at a time by one man. Built for the hardest punishment you can give it, this model (PP) is made of structural steel and steel castings. It hauls rolls sidewise, is adjustable to different diameter rolls and when the back roll is in place its weight lifts the loading skid which chocks it holding both rolls in position. Let this new model Skid-Em-On truck solve your handling-cost problem.

Write for information NOW!

CENTRAL MACHINE WORKS

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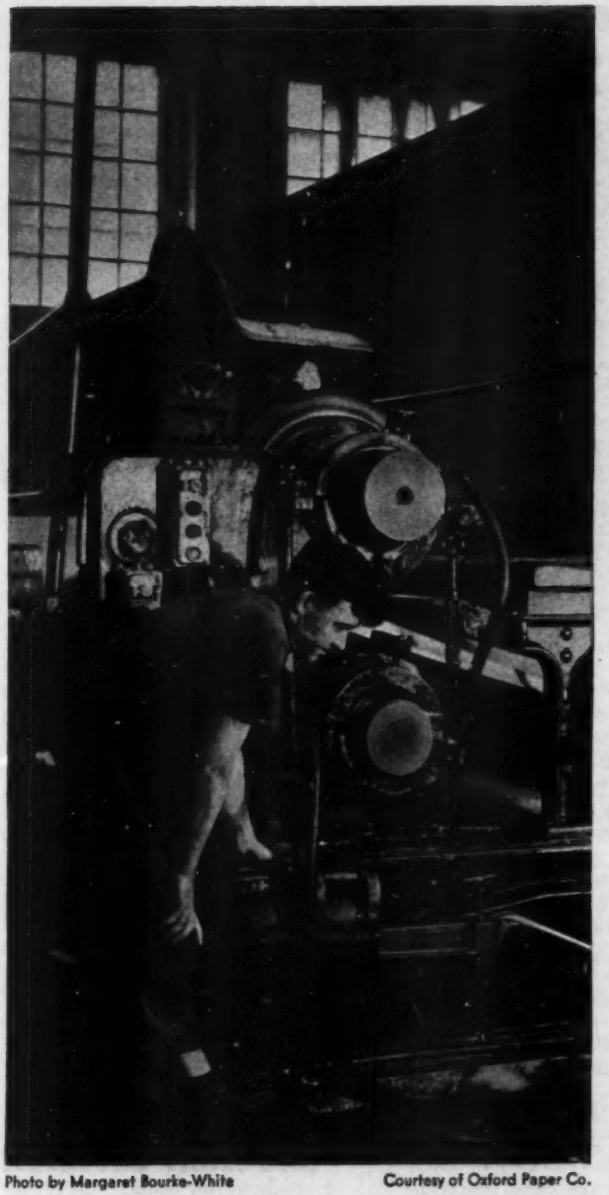


Photo by Margaret Bourke-White Courtesy of Oxford Paper Co.

The presses at the wet end of a paper machine of the Oxford Paper Company.

UNPLUG

the Neck of the Bottle

VISITORS at paper mills are often surprised to learn that all the actual manufacturing of paper is done by such a small section of the machine while so large a section does nothing but dry the sheet after it has left the couch and press. To the uninitiated, the bottle neck appears too long for the size of the bottle.

The problem of the paper maker is to increase the flow of paper by reducing the amount of water that passes through the neck of the bottle. By removing more water at the wet end of your machine, a Hamilton Felt will reduce the load on your driers, give your sheet better formation and unplug the bottle neck of your production.

From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

S A F E T Y

Neon-lighted safety scoreboard on Kimberly-Clark's Badger-Globe mill at Neenah, Wisconsin.

K-C CORP. HAS UNIQUE TYPE OF SAFETY CONTEST

The Kimberly-Clark Corporation has made a careful study of safety, and is now carrying on a contest at the Badger-Globe, Neenah, mill that is unusual for the reason that several factors not ordinarily taken into account in safety promotion schemes are considered in arriving at the score.

The company has arrived at the conviction that many things such as unsafe practices, poor housekeeping, violations of safety rules and the like, precede a poor departmental accident record. Therefore, the contest is based on these factors as well as on the actual accident record itself.

Once each month, the mill is inspected by a three-man committee composed of a member of the Personnel Department, one department head, and a neutral member, usually from one of the staff offices. In each department, unsafe and unsanitary conditions are noted, as well as violations of safety rules, unsafe practices, etc. These items or conditions are then scored against the department in which they are found.

Each of the six departments start with 100 points each month, this representing 100 per cent, or a perfect score. The penalties for the various conditions found, or for lost-time accidents, are added together and deducted to determine the monthly score for the department. These monthly scores are then carried forward to become an accumulated average score for the duration of the contest. After each inspection, the ratings are posted on the departmental bulletin boards and on the large central board which is Neon lighted (see illustration).

In order that large departments will not be at a disadvantage over the smaller departments, the penalties for the various factors are weighted; that is, the Manufacturing Department loses 6.5 points for each lost-time accident, while the Kimflex Department loses 30 points for the same thing; thus, the risk between the large and small departments is equalized.

At the close of the contest, the winning department will be tendered a recognition dinner. The losers will probably serve the dinner and wash the dishes.

The contest only started three months ago, but already it has fostered a high degree of competition and has awakened a new interest in safe operation.

◆

▶▶▶ TWO FIRES, believed to have been caused by a hot motor turning the suction fan in the air ducts in the paper machine room at Finch, Pruyn and Company, Glens Falls, New York, were quickly brought under control on the night of August 19. Both fires, which were confined to the air ducts and hoods over and beneath number two and three machines, were extinguished by booster lines and a line of small hose belonging to the mill.

◆

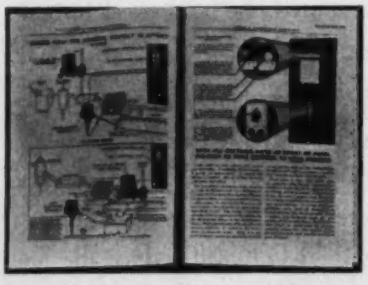
▶▶▶ TWENTY-FIVE COLLEGE STUDENTS, home on vacation, painted the interior and exterior of the main plant and auxiliary buildings of the Whiting Plover Paper Company, Stevens Point, Wisconsin. The job was started in May and was completed September 1.

◆

MASS. SAFETY BODY HONORS AWP CROCKER DIVISION

A praiseworthy safety record has been set up and maintained by the American Writing Paper Corporation, Holyoke, Massachusetts, according to an announcement by the Massachusetts Safety Council, Division of Labor in Industry. The Crocker Division received an award for the perfect safety record it has established among paper mills in the small group category. This perfect record was equaled by the Riverside Division, although this division has been classified as a large group because the man-hour exposure is greater than at the Crocker mills, therefore it must be entered into competition with larger plants.

The Riverside Division has worked 317,060 man-hours without any lost time due to injuries, while the Crocker Division has worked 222,403 consecutive man-hours with no lost time.



If pH Means Anything To You—
Read This New Book!

If the pH of paper stock is of importance in your paper mill, you'll want this new 16-page catalog on Micromax pH Control. In it you'll find layout diagrams for pH control of both stock and white water. You'll find *big* illustrations of various installations and of the control equipment. You'll find "how it works" and all about its care and maintenance (These are slight, but you'll want to know them in advance). And you'll find typical comments from users, referring to the better strength, texture and color they secure, to reduced white-water loss, longer wire-life, savings in chemicals; improved permanency of paper.

Ask for Bulletin N-96-709D.

LEEDS & NORTHRUP

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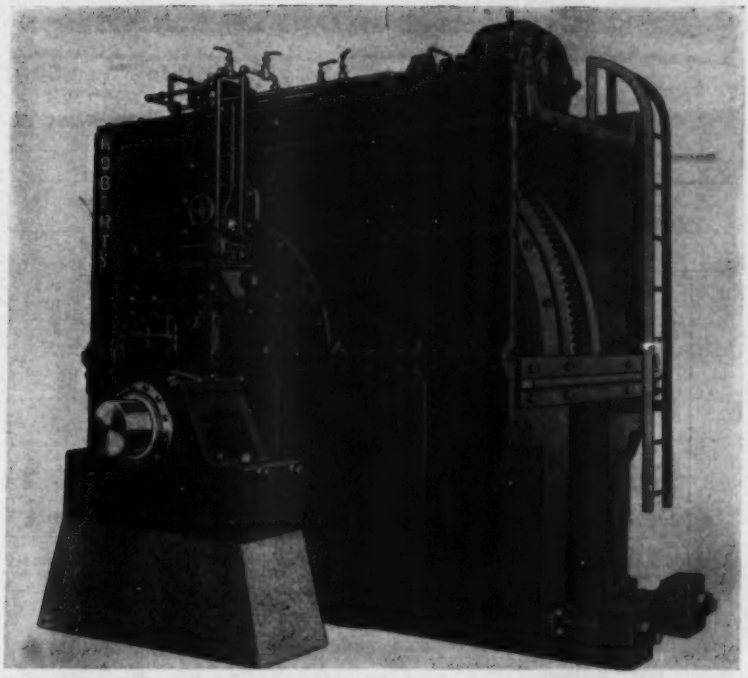


THE APPLETON MACHINE COMPANY

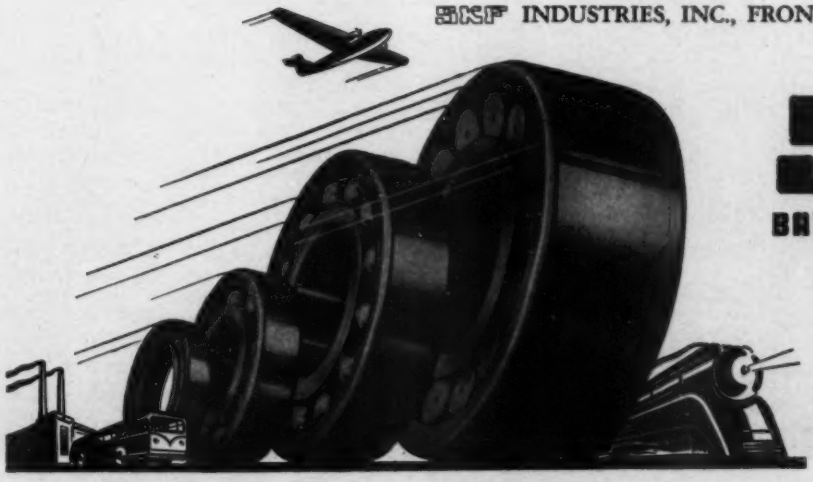
SKF's

Help You

GRIND MORE PULP

KEEPING this Appleton Roberts Pulp Grinder in fighting trim isn't much of a job as far as bearings are concerned. For while this continuous pulp grinder eliminates the "down time" for loading pockets, SKF Bearings work together in keeping vital rotating parts in proper alignment. Their precision, long life, and many other advantages play an important part in helping this unit "appreciably lower the cost per ton of pulp." 4873

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.



SKF

BALL & ROLLER BEARINGS

THE PAPER INDUSTRY ANNUAL SAFETY CONTEST

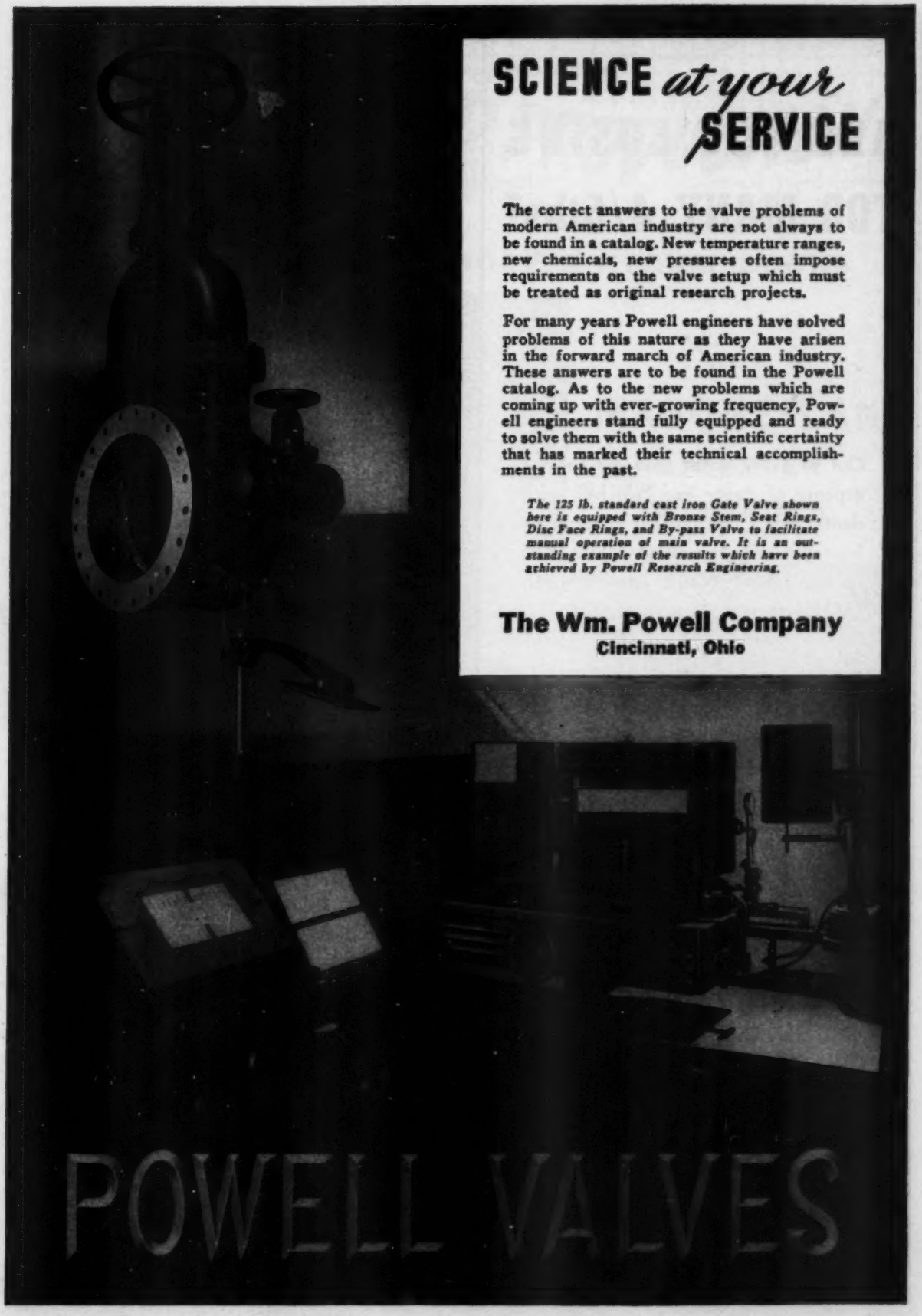
July 1, 1940 to June 30, 1941

Final Rankings of Contestants as of June 30, 1941

Division One — Paper and Pulp Mills

Final Rank	Unit	Man-Hrs. Worked	Report Inj.	Freq. Rate
	Group A (Units averaging 100,001 or more man-hours per month.)			
1	Consolidated Paper Corp., Ltd., Wayagamack Div.	2,199,624	3	1.36
2	The Flintkote Co., Pioneer Div.	1,434,475	3	2.09
3	Price Brothers & Co., Ltd., Riverbend Paper Mills	1,855,547	4	2.16
4	Consolidated Paper Corp., Ltd., Port Alfred, P. Q. Canada	1,663,126	4	2.41
5	Fraser Paper Ltd., Madawaska, Me.	1,261,190	4	3.17
6	The Mead Corp., Chillicothe, Ohio Div.	3,297,610	11	3.34
7	Anglo-Canadian Pulp & Paper Mills, Ltd., Quebec City, P. Q. Canada	2,042,548	7	3.43
8	Hollingsworth & Whitney Co., Algonquin & Tacomnet Mills	3,417,329	12	3.51
9	Price Brothers & Co., Ltd., Kenogami, P. Q., Canada	2,585,552	10	3.87
10	International Paper Co., Hudson River Mill No. 3.	2,255,273	9	3.99
11	The Mead Corp., Kingsport, Tenn.	1,628,508	7	4.30
12	Marathon Paper Mills Co., Menasha Div.	2,296,534	11	4.79
13	The Gardner-Richardson Co., Lockland, Ohio	1,862,411	9	4.83
14	Anglo-Newfoundland Development Co., Ltd., Grand Falls, Newfoundland	3,528,823	18	5.10
15	The Champion Paper & Fibre Co., Houston Div.	1,368,291	9	6.58
16	Consolidated Paper Corp., Ltd., Belgo, Shawinigan Falls, P. Q., Canada	1,627,156	11	6.76
17	Bird & Son, inc., East Walpole, Mass.	1,625,323	11	6.77
18	Rayonier Inc., Grays Harbor Div., Hoquiam, Wash.	1,351,189	10	7.40
19	P-167	2,603,228	20	7.68
20	Paterson Parchment Paper Co., Bristol Plant	1,214,666	10	8.23
21	Bryant Paper Co., Kalamazoo, Mich.	2,234,956	20	8.95
22	Canadian International Paper Co., Mill No. 16	2,225,529	20	8.99
23	Kimberly-Clark Corp., Lakeview Mill	2,315,739	21	9.07
24	Consolidated Paper Corp., Ltd., Laurentide, Grand'-Mere, P. Q., Canada	2,005,676	19	9.47
25	Mersey Paper Co., Ltd., Liverpool, N.S.	1,247,209	13	10.42
26	International Paper Co., Niagara Falls, New York	1,684,195	18	10.69
27	Hammermill Paper Co., Erie, Pa.	3,268,561	35	10.71
28	Brown Paper Mill Co., Inc., Monroe, La.	2,242,072	26	11.60
29	Rhinelander Paper Co., Rhinelander, Wis.	1,290,008	15	11.628
30	Kieckhefer Container Co., Delair Plant	1,719,645	20	11.630
31	Nekoosa Edwards Paper Co., Nekoosa Mill	1,522,995	18	11.82
32	The Gardner-Richardson Co., Middletown, Ohio	1,292,894	17	13.15
33	Fraser Paper Ltd., Edmundston, N. B., Canada	1,475,714	20	13.55
34	Union Bag & Paper Corp., Pulp & Paper Mill, Savannah, Ga.	1,581,405	22	13.91
35	Thilmany Pulp & Paper Co. Upper Mill, Kaukauna, Wis.	1,370,256	19	14.61
36	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., Camas, Wash.	3,299,110	50	15.16
37	Marathon Paper Mills Co., Rothschild Div.	1,776,658	27	15.20
38	Kimberly-Clark Corp., Kimberly, Wis.	2,627,661	40	15.22
39	Alton Box Board Co., Alton, Ill.	1,428,119	23	16.11
40	Masonite Corp., Laurel, Miss.	3,857,928	63	16.33
41	P-170	3,114,189	51	16.38
42	Gulf States Paper Corp., Tuscaloosa, Ala.	1,849,891	31	16.76
43	Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.	2,262,380	42	18.56
44	Kimberly-Clark Corp., Niagara Falls, N. Y.	2,455,836	46	18.73
45	P-171	3,817,690	83	21.74
46	Bathurst Power & Paper Co., Ltd., Bathurst, N. B., Canada	1,929,165	45	23.33
47	Minnesota & Ontario Paper Co., International Falls, Minn.	2,134,449	54	25.30
48	The Northwest Paper Co., Cloquet, Minn.	2,301,265	59	25.64
49	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., West Linn, Ore.	1,528,865	40	26.16
50	P-168	1,371,112	36	26.26
51	Spruce Falls Power & Paper Co., Ltd., Kapuskasing, Ont., Canada	2,256,710	64	28.360
52	North Carolina Pulp Co., Plymouth, N. C.	1,621,856	46	28.363
53	P-172	1,311,536	40	30.50
54	Container Corp. of America, Philadelphia	2,119,163	77	36.34
	Group B (Units averaging 60,001 to 100,000 man-hours per month.)			
1	P. H. Glatfelter Co., Spring Grove, Pa.	1,122,804	2	1.78
2	St. Croix Paper Co., Woodland, Me.	872,602	2	2.29
3	Hoberg Paper Mills, Inc., Division "A," Green Bay, Wis.	1,014,424	3	2.96
4	Southern Kraft Corp., Continental Div.	1,063,770	4	3.76
5	The Flintkote Co., New Orleans, La.	956,111	4	4.17
6	Quebec North Shore Paper Co., Baie Comeau, P. Q., Canada	1,077,804	6	5.57
7	Rayonier Inc., Port Angeles, Wash.	1,158,703	9	7.77
8	International Paper Co., Fort Edward, N. Y.	1,142,400	9	7.88
9	P-169	744,394	6	8.06
10	Kimberly-Clark Corp., Niagara, Wis.	1,163,791	11	9.21
11	The Mead Corp., Heald Div., Lynchburg, Va.	1,038,065	11	10.62
12	Kimberly-Clark Corp., Badger-Globe Mill, Neenah, Wis.	917,820	11	11.98
13	The Mead Corp., Dill & Collins, Inc., Philadelphia, Pa.	1,158,134	14	12.09
14	The Munising Paper Co., Munising, Mich.	810,319	11	14.37
15	Crown Zellerbach Corp., National Paper Products Co. Div., Townsend, Wash.	1,009,200	15	14.86
16	A. P. W. Paper Co., Inc., Albany, N. Y.	1,143,488	17	14.87
17	Rayonier Inc., Shelton Div.	1,096,028	17	15.51
18	Thilmany Pulp & Paper Co., Lower Mill	937,525	15	16.00
19	Detroit Sulphite Pulp & Paper Co., Detroit, Mich.	942,391	16	16.98
20	Crown Zellerbach Corp., Washington Pulp & Paper Corp. Div., Port Angeles, Wash.	891,784	16	17.94
21	Consolidated Water Power & Paper Co., Biron, Wis.	834,995	15	17.96
22	Watervliet Paper Co., Watervliet, Mich.	972,428	19	19.54
23	American Box Board Co., Grand Rapids, Mich.	1,155,258	23	19.91
24	Nekoosa Edwards Paper Co., Port Edwards, Wis.	1,038,163	22	21.19
25	Container Corp. of America, Ogden Div., Chicago, Ill.	1,137,971	27	23.73
26	The Insulite Co., International Falls, Minn.	912,809	26	28.48
27	The Ontario-Minnesota Pulp & Paper Co., Ltd., Fort Francis Div.	955,814	38	35.76
28	Restigouche Company, Ltd., Campbellton, N. B., Canada	1,081,554	53	49.03
29	Continental Paper Co., Ridgefield Park, N. J.	730,459	52	71.19
	Group C (Units averaging 30,001 to 60,000 man-hours per month.)			
1	Price Brothers & Company, Ltd., Jonquiere Mill	495,675	0	0
1	The Mead Corp., Harriman Div.	365,390	0	0
3	Strathmore Paper Co., Woronoco Mills	533,116	1	1.88
4	Rising Paper Co., Housatonic, Mass.	472,345	1	2.12
5	International Paper Co., North Tonawanda, N. Y.	707,614	2	2.83
6	Donohue Brothers Limited, La Malbaie, P. Q., Canada	547,631	2	3.65
7	Escanaba Paper Co., Escanaba, Mich.	679,305	3	4.42
8	Strathmore Paper Co., West Springfield Mills	642,104	3	4.67
9	American Writing Paper Corp., Riverside No. 2, Holyoke, Mass.	419,203	2	4.77
10	The Eddy Paper Corp., White Pigeon, Mich.	604,392	5	8.27
11	Cornell Wood Products Co., Cornell, Wis.	707,421	6	8.48
12	The Crystal Tissue Co., Middletown, Ohio	570,966	5	8.76
13	Finch, Pruyn & Co., Inc., Glens Falls, N. Y.	516,510	5	9.68
14	The Mead Corp., Southern Extract Co., Knoxville, Tenn.	376,502	4	10.62
15	Rayonier Inc., Tacoma Div.	360,032	4	11.11
16	Consolidated Water Power & Paper Co., Appleton, Wis.	470,235	6	12.76
17	Central Fibre Products Co., Quincy, Ill.	616,166	8	12.98
18	The Mead Corp., Sylva Paperboard Co.	368,283	5	13.58
19	Esleeck Manufacturing Co., Turners Falls, Mass.	361,794	5	13.82
20	Container Corp. of America, Wabash, Ind.	555,257	9	16.21
21	Hoberg Paper Mills, Inc., Division "B," Green Bay, Wis.	537,246	10	18.61
22	The Upson Co., Lockport, N. Y.	474,961	9	18.95
23	Container Corp. of America, Coated Board, Chicago	630,843	13	20.61
24	Bemis Bro. Bag Co., Peoria, Ill.	713,763	17	23.82
25	The Lawrence Paper Co., Lawrence, Kan.	446,518	11	24.64
26	American Writing Paper Corp., Linden Div.	393,220	10	25.43
27	Lee Paper Co., Vicksburg, Mich.	454,120	12	26.42
28	Ontonagon Fibre Corp., Ontonagon, Mich.	441,738	13	29.43
29	Port Huron Sulphite & Paper Co., Pulp Mill, Port Huron, Mich.	420,355	13	30.93
30	Bergstrom Paper Co., Neenah, Wis.	417,313	13	31.15
31	Union Bag & Paper Corp., Fenimore Paper Mill, Hudson Falls, N. Y.	553,947	18	32.49
32	Fernstrom Paper Mills Inc., Pomona, Calif.	379,543	13	34.25
33	Central Fibre Products Co., Hutchinson, Kan.	519,414	22	42.36
34	Bedford Pulp & Paper Co., Big Island, Va.	455,551	21	46.09
35	Port Huron Sulphite & Paper Co., Paper Mill, Port Huron, Mich.	374,348	19	50.75
36	Container Corp. of America, Fernandina, Fla.	430,124	36	83.70
	P-166	363,535*	29	79.77
	Group D (Units averaging 6,000 to 30,000 man-hours per month.)			
1	Bird & Son, inc., Phillipsdale, R. I.	331,556	0	0
1	United States Gypsum Co., North Kansas City, Mo.	203,660	0	0
1	The Mead Corp., Nashville, Tenn.	184,474	0	0
1	Spaulding Fibre Co., Inc., Milton, N. H.	179,605	0	0
1	Central Fibre Products Co., Vincennes, Ind.	157,656	0	0
1	Spaulding Fibre Co., Inc., Hayes, N. H.	78,175	0	0
7	American Writing Paper Corp., Parsons, Holyoke, Mass.	340,247	1	2.94
8	American Asphalt Roof Corp., East St. Louis, Ill.	257,057	2	7.78
9	American Writing Paper Corp., Crocker Div., Holyoke, Mass.	329,979	3	9.09
10	Hollingsworth & Whitney Co., Abenaquis Mill, Madison, Me.	192,814	2	10.37
11	American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.	348,620	3	12.07
12	Rogers Fibre Co., Inc., Fibreboard Mill—Div. 1	162,337	2	12.32
13	Central Fibre Products Co., Tama, Iowa	333,232	5	15.00
14	The Flintkote Co., Little Ferry, N. J.	325,510	5	15.36
15	Consolidated Water Power & Paper Co., Stevens Point, Wis.	265,605	5	18.82
16	The Wisconsin River Paper & Pulp Co., Stevens Point, Wis.	350,597	8	22.82
17	American Writing Paper Corp., Mt. Tom Div., Holyoke Mass.	165,537	4	24.16
18	Union Bag & Paper Corp., Allen Paper Mill, Hudson Falls, N. Y.	290,141	7	24.99
19	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., Lebanon, Ore.	388,245	8	25.95

(Concluded on page 560)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The correct answers to the valve problems of modern American industry are not always to be found in a catalog. New temperature ranges, new chemicals, new pressures often impose requirements on the valve setup which must be treated as original research projects.
For many years Powell engineers have solved problems of this nature as they have arisen in the forward march of American industry. These answers are to be found in the Powell catalog. As to the new problems which are coming up with ever-growing frequency, Powell engineers stand fully equipped and ready to solve them with the same scientific certainty that has marked their technical accomplishments in the past.
The 125 lb. standard cast iron Gate Valve shown here is equipped with Bronze Stem, Seat Rings, Disc Face Rings, and By-pass Valve to facilitate manual operation of main valve. It is an outstanding example of the results which have been achieved by Powell Research Engineering.
The Wm. Powell Company
Cincinnati, Ohio
POWELL VALVES

ARE YOU LOSING TOO MANY 4/5ths?

Out of every dollar paid out for the expense of Paper and Pulp Mill accidents, only 1/5th (20c) is covered by Insurance. The remaining 4/5ths (80c) comes out of YOUR pocket in INDIRECT costs.

But when you put National Safety Council Accident Prevention Service to work in your plant it will—when properly applied—cut down the Frequency and Severity of your accidents, and, of course, those 4/5th losses which you have been paying for.

The Council's Safe Practices Pamphlet No. 42—"Organizing a Complete Industrial Safety Program" tells exactly what to do and how to do it. A complimentary copy is available for you—just write on your company letterhead to Paper & Pulp Section—

NATIONAL SAFETY COUNCIL

20 North Wacker Drive, Chicago, Illinois

(Continued from page 578)

Division Two — Paper and Board Re-manufacturing Plants

Final Rank	Unit	Man-Hrs. Worked	Report Inj.	Freq. Rate
20	Alton Box Board Co., Carlyle, Ill.	112,984	3	26.55
21	Fort Orange Paper Co., Box Board Mill, Castleton on Hudson, N. Y.	280,947	9	32.03
22	Central Fibre Products Co., Mt. Carmel, Ill.	151,822	5	32.93
23	Container Corp. of America, Carthage, Ind.	348,178	12	34.47
24	The Mead Corp., Wheelwright Div., Leominster, Mass.	344,573	14	40.63
25	Container Corp. of America, Circleville, Ohio.	302,967	14	46.21
26	The Northwest Paper Co., Brainerd, Minn.	326,081	17	52.13
27	American Writing Paper Corp., Gill Div., Holyoke, Mass.	131,012	7	53.43
28	Alton Box Board Co., Lafayette, Ind.	234,110	22	93.97
29	Container Corp. of America, Wilmington, Del.	96,210	16	163.92
1	Bird & Son, Inc., Roofing Plant, Chicago, Ill.	203,442	0	0
1	Bird & Son, Inc., Roofing Plant, Shreveport, La.	161,477	0	0
1	Bay West Paper Co., Green Bay, Wis.	109,822	0	0
1	Marathon Paper Mills Co., Ashland, Wis.	383,113	1	2.61
5	Gaylord Container Corp., St. Louis Container Plant	1,050,009	3	2.86
6	Kimberly-Clark Corp., Atlas Mill	309,645	1	3.23
7	The Flintkote Co., Rutherford Plant	1,052,849	5	4.75
8	Bird & Son, Inc., Norwood, Mass.	836,833	4	4.78
9	Dixie-Vortex Co., Easton, Pa.	1,268,900	8	6.30
10	Barber Asphalt Corp., Madison, Ill.	311,043	2	6.43
11	Union Bag & Paper Corp., Bag Factory, Savannah, Ga.	1,354,809	9	6.64
12	The Flintkote Co., Chicago Heights, Ill.	935,236	7	7.48
13	F. J. Kress Box Co., Pittsburgh, Pa.	506,330	5	8.38
14	Union Bag & Paper Corp., Chicago Bag Factory	637,493	7	10.98
15	Union Bag & Paper Corp., Grocer Bag Factory, Hudson Falls, N. Y.	568,109	7	12.32
16	Union Bag & Paper Corp., Specialty Bag Factory, Hudson Falls, N. Y.	1,055,147	15	14.22
17	Container Corp. of America, Cincinnati, Ohio.	415,794	6	14.43
18	The Container Co., Van Wert, Ohio.	622,381	9	14.46
19	Container Corp. of America, Anderson, Ind.	317,973	5	15.72
20	Fort Orange Paper Co., Paper Box Plant, Castleton-on-Hudson, N. Y.	618,645	10	16.16
21	R-28.	609,180	11	18.06
22	Gaylord Container Corp., Bogalusa, La.	904,955	18	19.89
23	Container Corp. of America, Chicago, Ill.	751,584	15	19.96
24	Container Corp. of America, Cleveland, Ohio.	291,618	6	20.57
25	Chicago Carton Co., Chicago, Ill.	725,604	18	24.81
26	Marathon Paper Mills Co., Wausau Div.	625,653	16	25.57
27	Barber Asphalt Corp., Barber, N. J.	438,088	12	27.39
28	Gaylord Container Corp., Dallas, Texas	214,988	7	32.56
29	Container Corp. of America, Natick, Mass.	207,818	7	33.68
30	Gaylord Container Corp., Houston Plant	178,049	7	39.32
31	Container Corp. of America, Rock Island, Ill.	111,689	8	71.63

*June report missing—not ranked Withdrawn: P-110

SUMMARY

1) The 1940-1941 Contest set a new high mark for participation—180 mills and factories. The Contest was the fifteenth conducted by the Paper and Pulp Section.
2) The competition covered 92,016 employees who worked 184,039,939 man-hours during the year. This also exceeds the exposure for any previous year.
3) The average rate for all participants was 14.32. Paper mills had the highest rates, averaging 14.49 against 12.75 for remanufacturing.
4) Frequency rates averaged one per cent above the average in the 1939-1940 competition. Rates increased 12 per cent in remanufacturing. Only groups A and C of paper mills were successful in improving their rates.
5) The following tabulation summarizes the 1940-1941 experience:

Divisions	No. of Units	No. of Employees	No. of Man-Hours	No. of Injuries	Frequency Rate	Per Cent change over 1939-40
Total	180	92,016	184,039,939	2,635	14.32	+1%
Paper Mills	149	83,040	166,081,858	2,406	14.49	0
A	54	55,799	111,588,330	1,403	12.57	−1%
B	29	14,540	29,091,008	474	16.29	+7%
C	37	9,189	18,376,580	355	19.32	−4%
D	29	3,513	7,025,940	174	24.77	0
Remanufacturing	31	8,976	17,958,081	229	12.75	+12%

SAFETY AND DEFENSE WILL BE THEME OF SAFETY CONGRESS

The complete program for the 30th National Safety Congress and Exposition to be held at the Stevens Hotel, Chicago, October 6-10, has been published. From the Annual Meeting of Members on Monday morning, through all the sections, interesting sessions have been planned.

The keynote of the Congress will be "Help Defense—Stop Accidents." Each section will treat safety and the national emergency with particular emphasis on its field. At the luncheon of the Paper and Pulp Section on Thursday, trophies will be presented to mills making the best record in the paper industry safety contest.

Those who expect to attend and have not made reservations, should do so at once, as the time is short and accommodations at the last minute may be problematical.

GET INCREASED PRODUCTION

AND MORE UNIFORM COOKS

WITH

MASONEILAN DIGESTER CONTROLS

Digester controls in a large New England mill

Left: Rate of steam flow and pressure relief controllers for two digesters

Right: Pressure relief control valve and digester level recorder

*Used under Chemipulp Process license.

If you do not have a circulating system, Masoneilan Automatic Rate of Steam Flow and Pressure Relief Controls are two means of producing better pulp —faster—today.

Successive cooks are more uniform because each one is carried out under identical, predetermined conditions of steam flow and relief. The operator has complete control over every phase of the process. There is a valuable, permanent record of steam flow and pressure. Shortened cooking time speeds up production.

Have you investigated how Masoneilan Controls can help your pulp production? Let us send you full information.

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NAMES *in the* NEWS

Personals

GEORGE BURNS NOW HEADS NSC's BUSINESS DIV.

The National Safety Council, Chicago, has announced a major change in the staff duties of George E. Burns, well known to all members of the Paper and Pulp Section. Mr. Burns has been appointed director of the Business Division to succeed Howard C. Seehausen, who has resigned on account of illness.

In 1925, Mr. Burns became associated with the Council as safety engineer in the Industrial Division, having had previous industrial and insurance experience. He has served as director of Regional Conferences, and in 1940 was appointed assistant director of the Industrial Division. He also is secretary of the ASSE-Engineering Section of the Council.

George E. Burns

Mr. Burns probably is best known to a large number for his work in supervising the annual safety congress. He will retain this work, even though his new duties will broaden the scope of his activities considerably.

◆

▸▸▸ The Board of Trustees of the Fox River Paper Corporation, Appleton, Wisconsin, elected *Leo T. Crowley* to the Board at a recent meeting. Mr. Crowley is chairman of the Federal Deposit Insurance Corporation and president of the General Paper Company, Madison, Wisconsin. Succeeding the late Colonel M. E. Roberts, Mr. Crowley is also chairman of the board and president of the Standard Gas and Electric Company, New York.

◆

▸▸▸ The former president and general manager of the Greenfield Tap & Die Corporation, Greenfield, Massachusetts, *Howard M. Hubbard,* has been elected president of the Elliott Company, Pittsburgh. He started in his new position on September 1.

◆

▸▸▸ A member of the staff at The Institute of Paper Chemisty, *Dr. J. A. Van den Akker* has been granted a patent for a method and apparatus for measuring the water resistance of paper. He has assigned the rights to the Institute.

◆

J. L. RITCHIE NOW WITH OPM ON PRIORITIES

Formerly in charge of the Washington office of the American Paper and Pulp Association, J. L. Ritchie, has been placed in the OPM office in general supervision of priority activities for the pulp and paper industry, as well as for the converted paper products and the printing industry.

Mr. Ritchie is succeded by John F. Darrow, formerly of the Bureau of Foreign and Domestic Commerce. Mr. Darrow has been spending part of his time in the Pulp and Paper Section of OPM being primarily employed in the Consumption Materials Unit. It has been announced that those companies needing action or information with respect to priorities should continue to address their mail to the Association's office in New York, and it will be forwarded to Mr. Darrow, if necessary.

◆

PERSONNEL CHANGES AT CRANE COMPANY

Three changes in the personnel of Crane Company, Chicago, were recently announced. The former assistant to the president, J. L. Holloway, was elected vice president in charge of finance for the company, W. H. Winslow, Jr., was made secretary, and L. W. Moore was appointed general purchasing agent.

Mr. Holloway joined the company in 1935, and was elected secretary in 1937. In 1940, he was also made assistant to the president, in which position he served until the recent election. Mr. Winslow became associated with the organization in 1939 to handle tax and legal matters, and has been assistant secretary since early in 1940. Mr. Moore was appointed to his new post to succeed D. G. Park, who recently retired.

◆

DR. KOBE LEAVES U. OF W.—NOW WITH U. OF TEXAS

On August 1, Dr. Kenneth A. Kobe, associate professor of chemical engineering at the University of Washington, terminated an association of ten years in that institution to become professor of chemical engineering at the University of Texas.

Dr. Kenneth A. Kobe

Dr. Kobe has done some outstanding work as a chemical engineer. His early work on the submerged combustion evaporation of sulphite waste liquor showed the value of evaporation by direct contact with hot gases, and has led to other types of equipment. His work on the colloid chemistry of sulphite waste liquor has given a better knowledge of the colloidal properties of the lignin sulphonic acid. He has published a series of paper in scientific journals on the chemistry of p-cymene (spruce turpentine) which included a study of nitration, mercuration, and hydrogenation.

At the fall meeting of TAPPI, held

Wild Water is all right to Bring in the Logs

BUT it has to be tamed to do the rest of its work in a paper mill—tamed and conditioned.

You know, the same water that floats the logs in from the woods also has to feed the boilers and make the paper.

And logs aren't all the water brings in either—it carries silt, hardness, alkalinity, coloring matter, and other substances in concentrations that vary all over the map,—substances harmful to the boilers and fatal to making good paper.

The same treatment that makes good boiler feed won't necessarily make the water suitable for paper manufacture. It has to be properly and skillfully conditioned for each use.

Graver knows how.

We have been conditioning water for years, all kinds of water for all purposes.

Send us samples of the water you use.

We will tell you what to do and install the equipment to do it.

Send your samples now to Graver Tank & Mfg. Co., Inc., 5042 Tod Avenue, East Chicago, Indiana.

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GRAVER TANK & MFG CO. INC.

in Seattle in August, 1940, a paper was presented covering work done by Dr. Kobe with Dr. L. C. Haffner on the sodium sulphite pulping process applied to Douglas fir and other pitchy woods. This work has been extended to show the effect of thiosulphate on pulping, and the working out of an improved recovery process for sodium sulphite. Some of this material has not been published. During his association with the University of Washington, over 80 of Dr. Kobe's technical and scientific papers have been published.

◆

ALEX. THOMSON TRAINS WEEK WITH OHIO NAT. GUARD

Alexander Thomson, Jr., vice president and advertising manager of the Champion Paper and Fibre Company, Hamilton, Ohio, recently returned from Camp Perry, where he engaged in a week of army maneuvers with the Hamilton Company of the Ohio State Guard. Mr. Thomson, who served as second cook for his company, expressed enthusiasm over the training period which was entered into by guardsmen from all sections of Ohio.

At present, Mr. Thomson, acting as general chairman, is completing plans for a sesquicentennial celebration to be held in Hamilton during October, celebrating the 150th anniversary of the completion of Fort Hamilton, famed outpost of the United States Army in the Indian Wars.

◆

DR. IRWIN PEARL IS NOW MEMBER OF INSTITUTE STAFF

Dr. Irwin A. Pearl, a graduate of the University of Washington, has been named a research assistant in the organic group at the Institute of Paper Chemistry, Appleton, Wisconsin. Dr. Pearl, who received the B.S., M.S., and Ph. D. degrees at Washington, was a teaching fellow at the same institution from 1934 to 1937 and did post doctorate research there for three more years. The title of his doctor's thesis was "Mechanisms of Certain Organic Reactions." He is a member of Sigma Psi and Phi Lambda Upsilon.

Dr. Irwin Pearl

Dr. Pearl has published numerous articles in the field of chemical research. During the past two years he did research work in conjunction with the Dr. H. K. Benson consultations relative to polutions of sea water by sulphite waste liquors.

◆

RUSSEL MADDEN RESIGNS FROM AWP CORPORATION

Russel S. Madden, vice president in charge of sales and a director of the American Writing Paper Corporation, Holyoke, Massachusetts, has resigned. During Mr. Madden's association with this company, which started in 1923, he was president of the Writing Paper Manufacturers' Association and also of the Cover Paper Manufacturers' Association. Since 1937, he has served as vice president and director of the American Writing Paper Corporation.

Although it was announced that the official titles left open by Mr. Madden's resignation would not be filled immediately, there have been some personnel changes. James H. Sweet has been made sales manager in full charge of merchant papers, Fred A. Curtis has been made sales manager in full charge of industrial and technical papers, and William J. Norton, in addition to his duties as treasurer, assumes the title of manager of advertising, and special sales promotion.

◆

DR. JOHN CAMPBELL NOW WITH REYNOLDS

The Reynolds Metals Company, Richmond, Virginia, announces it has secured the services of Dr. John Campbell who will be in full charge of the plant efficiency department devoted to the analysis and improvements of manufacturing methods. Dr. Campbell recently resigned as technical director of the International Paper Company, New York, with whom he had been associated since 1929.

Graduating from the Massachusetts Institute of Technology in 1921, Dr. Campbell accepted a position as technical adviser for the Johns-Manville Company in the United States, and the Abitibi Power and Paper Company, Ontario, Canada. During the first World War, Dr. Campbell worked in England, as manager of an electrochemical plant.

◆

CONTAINER CORP. SENDS BROSSARD TO WASHINGTON

John J. Brossard, vice president in charge of the Eastern Division of Container Corporation of America, Philadelphia, has been assigned to full-time duty in Washington, following the suggestion by E. R. Stettinius, Jr., Director of Priorities, that manufacturers and producers specifically assign special members of their staffs to handle priority and defense matters.

Walter P. Paepcke, president of Container Corporation, announced that this move was made to facilitate cooperation with all government agencies, and that Mr. Brossard because of his intimate knowledge of the industry would be well qualified to contact all departmental executives and administrators. The increasing demand of paperboard and paperboard products in defense industries makes this newly created post an extremely important one.

YOUR BEST

Source of Supply for:

Paper Machine Aprons

Carrier Rope

Deckle Webbing

"Resisto" Bias Cloth inserted Rubber Aprons used by nearly 400 Mills

"LAMBETH" Carrier Rope plain or graphited

DECKLE WEBBING—All widths and weights in stock. One day delivery

MOREY PAPER MILL SUPPLY CO.

309 South Street, Fitchburg, Mass.

PRECISION BEARINGS in 108 distinct series

To the machinery world, NORMA-HOFFMANN offers the most comprehensive line of anti-friction bearings in America—108 distinct series—ball, roller, needle and thrust types—1/8" to 21" bore, metric and inch sizes.

Many of these types have been pioneered by NORMA-HOFFMANN engineers to meet specific requirements growing out of advancing methods in machine design, manufacture and operation.

Today, with this wide choice of PRECISION BEARINGS available, engineers are no longer compelled to adapt their designs to the comparatively few standard bearing types of past years. There's a PRECISION BEARING for every load, speed and duty.

Write for the Catalog. Let our engineers work with you.

• BALL • ROLLER AND THRUST

"NORMA-HOFFMANN" PRECISION BEARINGS

NORMA-HOFFMANN BEARINGS CORPN., STAMFORD, CONN. U.S.A.

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

Flexco HD Rip Plate

Flexco HD Belt Fastener

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FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

We are "Sticking" to the Quality for which We have been Noted for Over Seventy Years.

There is no Substitute for Quality.

The Hauser-Stander Tank Co.
Cincinnati, Ohio

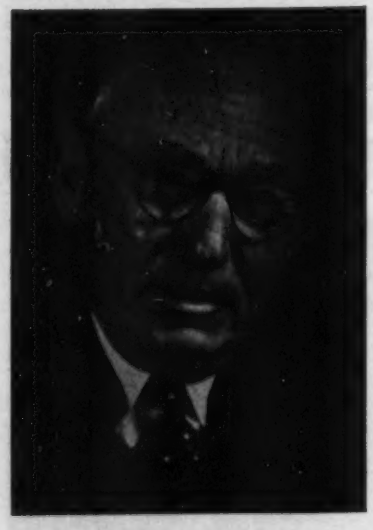
Necrology

ISADORE ZELLERBACH

One of the most colorful and outstanding business careers in the paper field came to a close August 7, when Isadore Zellerbach, chairman of the Executive Committee and director of Crown Zellerbach Corporation, passed away at the age of 75.

Born in 1866 in Moore Flats, California, Mr. Zellerbach added to his restricted formal education by experience gained in several years of hard work. In 1888, at the age of 22, he joined his father and brothers in business, and immediately started to apply his principles of business expansion. In 1906, the Zellerbach business was operating eighteen offices, salesrooms, and warehouses in San Francisco, as well as an Oakland branch.

It was during this same year that the disastrous San Francisco fire de-



Isadore Zellerbach

stroyed sixteen of the company's warehouses, but the organization was doing business the next day from its Oakland office, and three days later had one of the warehouses open to serve San Francisco.

In 1907 the partnership between Anthony Zellerbach and his sons was dissolved and the company was incorporated with a few stockholders and the Zellerbach family with Isadore Zellerbach as president. He continued in this position until the Crown Zellerbach Corporation was formed in 1928, at which time he was made president of the corporation. Up to 1914, the Zellerbach company had concerned itself exclusively with the merchandising of paper, but during that year, by organizing the National Paper Products Company, and later the Washington Pulp and Paper Corporation, the company extended its operations to the manufacture of towels and tissue, box board and newsprint.

The Zellerbach Corporation was organized in 1924 with Isadore Zellerbach as president, as a means of simplifying the business structure, which had become cumbersome through the acquisition of manufacturing and power units. In 1928, the corporation merged with the Crown Willamette Paper Company, forming the Crown Zellerbach Corporation, with Mr. Zellerbach continuing as president of the new corporation.

Resigning from his duties as president in 1938, Mr. Zellerbach became chairman of the Executive Committee, with his son J. D. Zellerbach succeeding him as president. At the time of his passing, he served in six different executive capacities, not only in the corporation in which he had played such an important role, but in many others.

Surviving him are his widow, a daughter, and two sons.

◆

▸▸▸ *Harry B. Jones, Sr.,* former superintendent of the United Paperboard Company, Thomson, New York, passed away August 29 at Binghamton, New York. Mr. Thomson also had been superintendent of the Downingtown Paper Company, Downingtown, Pennsylvania, and the Pynetree Paper Company, Gordon, Georgia. Surviving are his widow, a daughter, and a son.

◆

ALVAN T. SIMONDS

Alvan Tracy Simonds, president of the Simonds Saw & Steel Company, Fitchburg, Massachusetts, passed away September 2 at his home in Jamaica Plain, New York.

Mr. Simonds was born in Fitchburg 64 years ago. He graduated from Harvard after which he took a post-graduate course in metallurgy at Sheffield, England. He then started to work for the Simonds Manufacturing Company as laboratory assistant at its steel mill in Chicago.

During the following decade, he was successively foreman of the machine knives, worked in the advertising, cost, entry, purchasing, and sales department of the Chicago firm.

During the three years from 1910 to 1913, Mr. Simonds was in charge of the construction and operation of a new mill for the tool steel department of the company in Lockport, New York, and in 1913 he became president of the company that was afterwards named Simonds Saw & Steel Company. He gave up the presidency of the company in 1924 in favor of his brother, Gifford Simonds, but returned to that office when his brother passed away March 20, 1941.

One of Mr. Simonds' main interests was the American Chamber of Economics. He was considered an author-

Alvan Tracy Simonds

ity on steel-making and had advocated the study of economics by business executives and high school students. He was one of the chief backers of the Harvard Graduate School of Business Administration, and had served as regional director of the Chamber of Commerce of the United States. He was chairman of the executive committee of the American Supply & Machinery Manufacturers Association.

Surviving Mr. Simonds are his widow and two sons by his first marriage.

◆

CHARLES W. STRIBLEY

The paper industry in the Fox River Valley lost one of its important and colorful figures last month when Charles W. Stribley, for 34 years treasurer of the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin, passed away in Appleton, Wisconsin.

The 73 year old industrialist had retired from the office of treasurer in 1935. He was born near Fort Wayne, Indiana, in 1868, and moved to Madison when he was 20 years old.

Shortly after moving to Madison, he became interested in the railroad telegraph system and decided to become an operator. His first job was as night operator for the Northwestern Road at the Lake Shore Division depot in Appleton. He later opened a depot for the same carrier in Kimberly, Wisconsin, and two years later started with

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STARCH
FOR ENZYME CONVERSION

AMIJEL
FOR THE BEATERS

LAM-O-DEX
FOR LAMINATING

CORAGUM
FOR CORRUGATING

WRITE...

Corn Products Sales Co.
17 BATTERY PLACE
NEW YORK CITY

Hawley Pulp & Paper Co. is keyed for speed with JOHNSON JOINTS

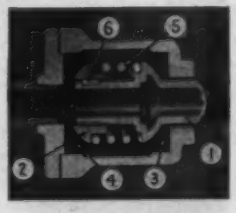
STEAM fits that demand constant inspection and tinkering, that waste valuable production time while machines are shut down to repack or replace stuffing boxes, just don't fit in today's picture.

Johnson Rotary Pressure Joints do. They never need to be oiled, adjusted or repacked. They absorb misalignment, both lateral and angular, without loss of operating efficiency. They make it easier to provide efficiency-boosting methods of syphon roll drainage — with a freedom of lateral movement that keeps syphon pipe from rubbing on dryer journals.

Hundreds of paper mills, like Hawley Pulp & Paper Co., have been quick to adopt this simple way to keep production figures up, maintenance costs down. Over a hundred mills now use 50 or more Johnson Joints; over fifty mills have purchased from 100 to as many as 800.

Write for comprehensive Bulletin

• Johnson Joints installed on a paper machine at Hawley Pulp & Paper Co., Oregon City, Oregon. No more steam fit troubles here.



The Johnson Rotary Pressure Joint

Nipple (1) fastened to roll. Sliding collar (2), keyed (6) to nipple. Carbon graphite rings (3) and (4) which eliminate oiling and packing. Spring (5) is for initial seating only—in operation joint is pressure sealed.

FOR DRY, CLEAN, OIL-FREE COMPRESSED AIR

—use this simple, long lasting Johnson-Gast Separator. Employs the two best principles of separation, expansion and change of direction —removes better than 99% of all foreign matter from compressed air. Also available for service on steam lines. The complete Johnson-Gast line includes After-coolers—to condense vaporized moisture so Separator can remove it —and Oil Absorbers—to remove every final trace of oil.

The Johnson Corporation
845 WOOD STREET THREE RIVERS, MICH.

the Kimberly-Clark Company in the paper industry.

He was with the Pulpwood Supply Company of Appleton for three years, and then joined Oscar Thilmany in the Thilmany Pulp and Paper Company which was incorporated in 1901. He was elected to the board of directors and to the office of treasurer. His long career was filled with many experiences, and he was considered the best narrator of paper-mill lore in the Fox River Valley. There are no close survivors.

◆

▶▶▶ *Edward P. Sherry,* president of the Winnebago Realty Company and the Wisconsin Realty Company of Milwaukee, Wisconsin, passed away August 6 at the age of 70. Mr. Sherry was formerly the president of the Flambeau Paper Company, Park Falls, Wisconsin, and later was made a director of the company. Surviving are his widow and a son.

◆

ROBERT A. McINNIS

Robert Alexander McInnis, former general manager of the Anglo-Canadian Pulp and Paper Mills, Quebec, passed away at his summer home near Port Carling, Ontario, at the age

Robert A. McInnis

of 57. Although Mr. McInnis retired from his position as general manager a few months ago, he remained with the firm as a director and advisor to the management.

Born in Gravenhurst, Ontario, in 1884, Mr. McInnis has devoted more than 40 years to the pulp and paper industry, most of which time was spent in Canada. Prior to his association with the Belgo-Canadian Pulp and Paper Company, Shawinigan Falls, Quebec, which started in 1900, he had some experience in the paper trade in the United States. In 1914, Mr. McInnis joined the staff of the newly-formed Abitibi Power and Paper Company, Toronto, Ontario, as assistant to the president, and in 1917 was made manager of the company in which capacity he served until 1926.

In 1927, Mr. McInnis went to the Anglo-Canadian Company as general manager and director, and served in both capacities until his recent retirement. For the past 13 years he was at the head of the Rothermere interests in Canada and Newfoundland. He also held the following positions; president of the Gaspesia Sulphite Company, vice president of the Anglo-Newfoundland Development Company, director of Tampax, Inc., also the Anglo-Newfoundland Steamship Company, the Terra-Nova Properties, and the Quebec Logging Corporation.

Mr. McInnis played an important part in the activities of the Canadian Pulp and Paper Association and was also chairman of the Technical Section during 1929 and 1930. Shortly afterward, he joined the executive committee of the Association and was elected president in 1936, remaining as such until 1939.

Surviving are his widow, two daughters, and a son.

◆

GEORGE W. PAULINE

George W. Pauline, former vice president and managing director of the Alliance Paper Mills, Ltd., Merritton, Ontario, and director of the Howard Smith Paper Mills, Ltd., Montreal, Quebec, passed away on August 17 at the age of 57. Mr. Pauline was a former chairman of the Coated Section of the Canadian Pulp and Paper Association and a member of the Canadian Manufacturers' Association.

Born in Glasgow, Scotland, Mr. Pauline was educated in England and moved to Canada in 1905. During this same year, he joined the staff of Ritchie & Ramsey, Ltd., Toronto, of which he was managing director for five years before he was appointed vice president and managing director of Alliance in 1930.

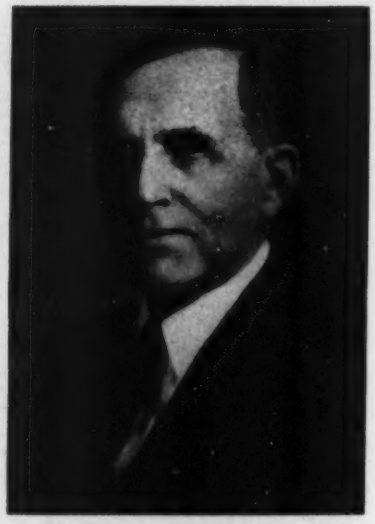
◆

▶▶▶ *Clarence H. Kennedy,* vice president in charge of sales of the Kennedy Valve Manufacturing Company, Elmira, New York, passed away recently. Graduating from Cornell University in 1912, Mr. Kennedy joined the Kennedy Company, which was founded by his father in 1877, and spent his entire business career with this company. After working himself through the ranks in several factory departments, he was made manager of the New York branch, then sales manager of the company, and in 1929 was appointed vice president in charge of sales. Surviving are his widow, a son, and four daughters.

◆

CHARLES T. RAMSDEN

Brief mention was made of the passing of Charles T. Ramsden, vice president of the Beloit Iron Works, Beloit, Wisconsin, in the last issue of this magazine (cf. THE PAPER INDUSTRY AND PAPER WORLD, August, 1941, p. 479), but all biographical facts were not available at that time.



Charles T. Ramsden

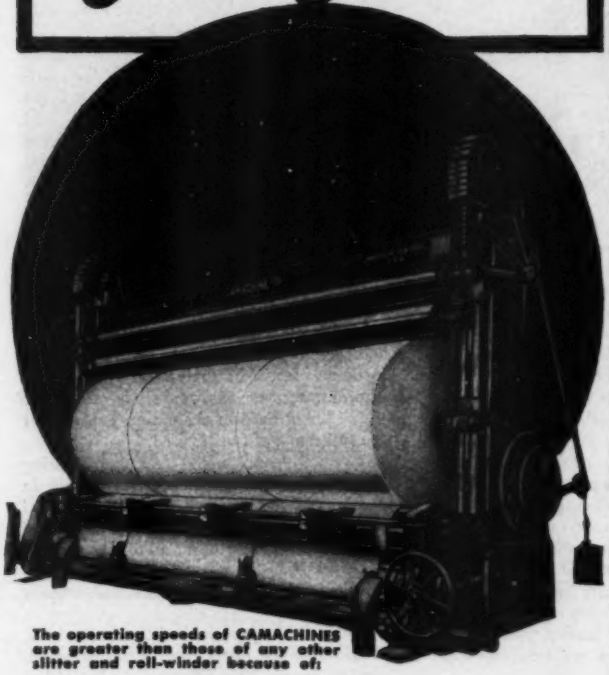
Born in Mineral Point, Wisconsin, in 1869, Mr. Ramsden went to Beloit in 1895—46 years ago—and one year later he became associated with the Beloit Iron Works as a machinist. During his 45 years with this company, he advanced through many positions, up to his most recent appointment as vice president. Mr. Ramsden was also a member of the Technical Association of Pulp and Paper Industry and of the American Pulp and Paper Mill Superintendents Association.

After serving as a machinist for several years, he was transferred to the erecting division, and later became superintendent. His next appointment was as director of all erecting operations of the company, in which capacity he traveled widely throughout the United States and Canada, supervising installations.

Shortly after his advancement, he was made a member of the firm's order department, and from there he was moved up into the sales division where he served as engineer and executive. He remained in this position for 25 years, and last January succeeded the late G. A. Macklem as vice president of the company.

Surviving are his widow, and a son.

Speedy Camachines Cut Costs



The operating speeds of CAMACHINES are greater than those of any other slitter and roll-winder because of:

RUGGEDNESS. The well-known ruggedness of CAMACHINE Winders is achieved by putting the weight into the base frames and side frames where it is needed and not by furnishing a heavy base plate, which does not compensate for structural weakness.

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DYNAMIC BALANCE. Lack of vibration at highest speeds is assured by dynamic balance of platen rolls, riding rolls, rewind drums, and idlers.

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Convention Papers . . . Abridged

The Cooking of Poplar and Hardwood by the Soda Process

DR. T. H. WERNER and R. T. GREEP
S. D. Warren Company

The most important cooking variables in the soda process are the cooking temperature or pressure, the length of the cooking period and the amount of caustic used in proportion to the weight of wood cooked. The effect of varying these factors within possible practical ranges on the yield and properties of the various woods usually cooked formed the basis of the project carried out.

Poplar, white and yellow birch, beech and maple were the woods included in the study.

The laboratory digester consisted of a 2 gallon steam-jacketed Dopp pressure kettle fitted with a gage and thermometer well to measure the pressure and temperature inside of the kettle. It held conveniently a charge of 1000 grams of chips on a bone dry basis.

In order to eliminate most of the foaming, during the cook, the chips were heated to boiling with the liquor in an Allegheny metal pail and then packed in the digester. The time required to bring to pressure was usually about 20 minutes. The cooking time was figured from the time the desired temperature was reached.

The chip supply was obtained from sound logs which had been sap peeled and seasoned in the yard about a year in the case of poplar and from 15-18 months in the case of the hardwoods. The chips were ⅜ in. in size and air dried to approximately 7 per cent moisture content. This moisture was included in calculating the volume of cooking liquor.

Solid sodium hydroxide was used to make the cooking liquor and in order to more nearly approach the causticity of commercially recausticized liquor, about 8 per cent sodium carbonate was added.

After removing from the digester, the pulp was immediately washed with hot water. This was followed by screening and two stage bleaching. The first stage was with chlorine water, while calcium hypochlorite was used in the second stage. Both stages were run at 3 per cent consistency and 77 deg. Fahr. The pulp was given a dilute caustic wash between stages.

The total volume of liquor in all the poplar cooks was 4.4 liters and for the hardwoods 3.3 liters were used. These volumes were sufficient to cover all the chips for both woods.

In order to lighten the experimental work and inasmuch as the effects of changing the cooking temperature should be similar to those obtained with poplar, this variable was not changed in the case of hardwoods. The cooking temperature was maintained at 347 deg. Fahr. of 115 lb. steam pressure in all cases, only the time of cooking and the amount of caustic added being varied.

In addition to the change in bleach requirements already mentioned, the observed effects produced on the fiber as a result of changing the cooking conditions were the change in strength characteristics and the effect on yield, ease of pulping, alpha cellulose content, bulking characteristics and amount of caustic consumed.

The strength and beating characteristics of the pulps were evaluated by means of the Abbe pebble mill.

Hand made sheets were prepared from the pulps and tested at 50 per cent relative humidity and 72 deg. Fahr. for Mullen, Elmendorf, and M.I.T. fold. Williams freeness tests were also made on corresponding samples.

Yields were obtained by weighing and determining the moisture content of the screened unbleached pulp.

Alpha cellulose content was determined by the standard TAPPI methods.

In the case of poplar wood there were no screenings down to and including 20 per cent caustic at 347 deg. Fahr. When 18 per cent and 16 per cent caustic was used there was 0.4 per cent and 6 per cent respectively. All the hardwoods on the other hand showed screenings at 20 per cent caustic but none at 22 per cent. Cooked with 20 per cent caustic maple gave 0.08 per cent screenings, beech 0.3 per cent, white birch a trace, and yellow birch 0.1 per cent. At 18 per cent caustic the screenings ranged from 4.6 per cent for beech to 0.54 per cent for white birch.

In summarizing it might be said that all hardwoods seem to cook with approximately the same degree of ease. All seem to be thoroughly cooked with 22 per cent caustic after 6 hours at 347 deg. Fahr., or 115 lb. steam pressure—but all showed signs of being somewhat undercooked with 20 per cent and were definitely raw with 18 per cent caustic. Even after but 4½ hours of cooking with 22 per cent caustic there was no sign of shives in any case. These experiments indicate that the same ease of pulping can be obtained with the hardwoods using 22 per cent caustic, and 4½ hours cooking as with poplar at 20 per cent and 4¼ hours cooking.

The caustic consumption of beech and maple was practically identical. Yellow birch seems to consume about 1 per cent more, based on the wood, while white birch takes an intermediate position. Poplar, on the other hand, requires about 3 per cent less caustic than beech and maple.

Yellow birch is by far the most difficult to bleach. With 22 per cent caustic at 6 hours, approximately 12.5 per cent total bleach is required. Within normal pulping ranges, i.e. 20-24 per cent caustic, there is clearly no great difference between white birch, beech, and maple. With 22 per cent caustic, close to 10 per cent bleach is required as compared to 7 per cent for poplar cooked under similar conditions.

Of all these five woods, yellow birch gives the strongest pulp. Beech is easily the poorest of all five pulps. Poplar and white birch take an intermediate position.

From the standpoint of strength alone, yellow birch, white birch and poplar are definitely superior to beech and maple. This is especially true of yellow birch.

The alpha cellulose content of the different hardwoods varies little and is essentially the same as poplar. Cooked at 22 per cent caustic, poplar contained 91 per cent alpha cellulose, maple 90.7 per cent, white birch 89.4 per cent, yellow birch 89.3 per cent, and beech 90.7 per cent. All tests were made on bleached samples.

Bulk measurements were made on each of the different hardwoods and on poplar over the full range of caustic used.

They all confirm the fact that cooking conditions make no appreciable change in the bulk of the bleached fiber. This seemed rather surprising as it was fully expected that mild cooking would lead to higher bulk. Such was not the case. Apparently, there is no clear relation between bulk and severity of cooking.

There is an appreciable difference in bulk, however, when fibers from different woods are compared. This difference is diminished by prolonged beating. The order of decreasing bulk is: yellow birch, beech, white birch, poplar and maple.

A mixture of 50 per cent poplar and 50 per cent yellow birch by weight was cooked with 22 per cent caustic at 347 deg. Fahr. for 4½ hours. The pulp was thoroughly cooked and no difficulty was experienced in bleaching the mixture of hard bleaching yellow birch and easy bleaching poplar.

The yield of the mixed cook was the equivalent of about 1300 lb. per cord which was a reduction of 20 lb. from the 1320 lb. per cord yield obtained when the woods were cooked separately. The bleach requirement of the mixed pulp was practically identical with the average of the two separate pulps. After two hours beating the bursting strength of the mixture was approximately the same. The Elmendorf test was 31 per cent lower for the mixed cook. Folding endurance was practically identical in both cases. Freeness was 26 per cent higher for the mixture as against the average of the two separate cooks.

From a consideration of all these results, it appears that poplar and hardwood can be cooked together without any particular difficulty, but at the expense of a small reduction in yield and some loss of strength. How-

Abridgments have been prepared of a large number of the papers presented at the annual convention of the American Pulp and Paper Mill Superintendents Association, which met at Poland Spring, Maine, June 17-19, 1941. The second installment was published last month. Other installments will appear in succeeding issues.

CONSIDER the Lewellen Way to *BETTER SPEED CONTROL*

● Look about in your plant! Are you allowing fixed machine speeds to bottleneck your production? RIGHT NOW, it will pay you to check the many advantages of Lewellen Variable Speed Control. Accurately maintained speeds even to a fraction of an r.p.m. usually mean improved machine-performance, increased output and a better product. Often Lewellen Automatic Controls perform modern miracles. Our engineers are constantly working with companies to solve their speed control problems. This is our specialty. It has been for more than 40 years. Write us. Tell us your problem. No obligation.

(Illustrated above) THE COUNTERSHAFT UNIT

For a wider speed-variation than is possible with the standard Lewellen Variable Speed Motor Pulley, or where the machine shaft pulley size is fixed, this highly-efficient Countershaft Unit is needed. Mounting the driven pulley on the countershaft will obtain the indicated speed at the countershaft. A further reduction (or increase) in speed from the countershaft, will give the correct machine speed.

The Countershaft Unit combines the adjustable motor base with pedestal, supporting a ball-bearing mounted shaft. Tie rods connect the two. Where a small driven pulley is mounted on the countershaft, a compact assembly is provided. For larger driven pulley diameters, slower countershaft speeds, and greater center distances, the countershaft unit is adjustable to meet space requirements, yet the unit is not bulky, nor excessively heavy. The countershaft pedestal is a box casting, for structural strength. Shaft and bearing sizes are ample for any duty.

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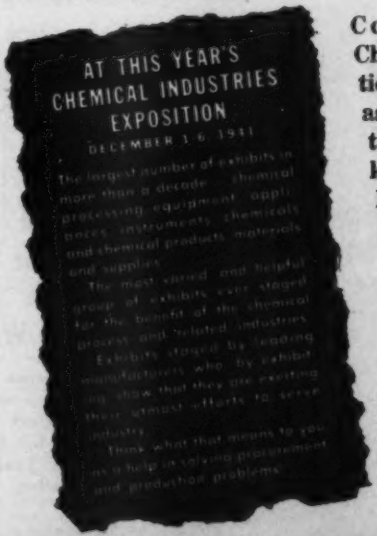
Three great floors of Grand Central Palace full of exhibits by the very top strata of suppliers—each of them devoting a week to the service of the chemical industries when such service is so important—each making it easy for you to see the actual products displayed and demonstrated—each providing chemical and engineering specialists eager to welcome consultation and discussion.



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536

ever, the proportion of poplar and hardwood in the mixture must be fairly accurately known, because allowance has to be made for the greater density of the hardwoods in calculating the pounds of caustic to be added per cord or per digester that would be equivalent to a given per cent on the bone dry wood.

Proper Use of Cypress in the Paper Mill

JOHN RENO
The Florida Louisiana Red Cypress Co.

There is a grade of cypress for each purpose in the mill for which cypress is recommended. If you use the correct grade, the results will be satisfactory. If you use any other grade, the results may be very unsatisfactory. You cannot just order "Cypress." It is necessary to specify the correct grade.

There is only one botanical classification for cypress, and that is *Taxodium Distichum*. Within that classification are three variations of the species. There is cypress that grows in swamps close to tidewater (Tidewater Red Cypress). There is cypress that grows in inland swamps, back in stagnant water (Deep Swamp Cypress). Then there is cypress that grows on dry land (Upland Cypress or Yellow Cypress).

All-Heart Tidewater Red Cypress is slow-growing, close-grained and oily. The oil does two things for the wood; it actually keeps chemicals from coming in contact with the cellulose and lignin of the wood itself, and it is toxic or poisonous to fungus.

The only difference between All-Heart Tidewater Red Cypress and Tidewater Red Cypress with a portion of sapwood is that the heartwood is full of the natural cypressene oil, while the oil is not present in the sapwood. The oil not being in the sapwood, it is subject to both chemicals and fungus.

When you order a quantity of cypress for your paper mill, you probably intend to use it where it has to resist decay, and wherever you see sapwood in it, you might just as well write that portion of the board off as a bad investment because it is not going to do satisfactory work under decay conditions.

Inland, Upland, or Yellow Cypress grows entirely up out of the water or swamps. It is a much faster growing piece of wood with a lot of springwood in it, a piece of wood inherently weak to begin with. In the summerwood, the cell walls of the fibres are thick and the air spaces are small; while in the springwood, the cell walls are thin and the air spaces are big.

Another characteristic of yellow cypress is that even in the heartwood there is not the oil content. That means when yellow cypress is exposed to acids or alkalis or to fungus conditions, you are likely to have early decay. So the next thing after making sure you do not have a lot of sapwood in your cypress, you have to make sure you have Tidewater Red Cypress, oily stock, rather than yellow cypress.

I have noticed a tendency among paper mill engineers to order "Clear Cypress" when they want good cypress. If we were to say "Clear Heart Cypress," we would eliminate the sapwood, but we can still have a piece of "Clear Heart" Yellow Cypress and it will not make a satisfactory board for paper mill use.

If you get cypress without the oil, you are not getting that thing which makes cypress better than other woods for decay resistance.

Those companies whose business is the manufacture of Tidewater Red Cypress belong to the Southern Cypress Manufacturers' Association. They have official inspectors who separate the Tidewater Red Cypress from all other variations of the species; that is, the oily cypress from the non-oily cypress.

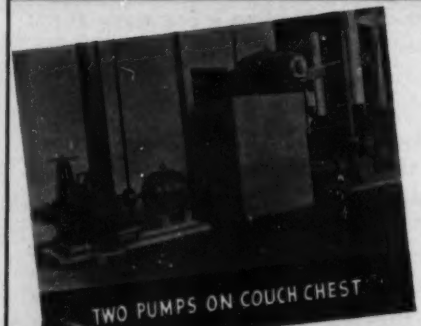
After separating the different variations of the cypress species, the inspectors put the arrow symbol on the Tidewater Red Cypress only—the identification mark of Tidewater Red Cypress. There is good cypress produced outside of the association—not very much, but some.

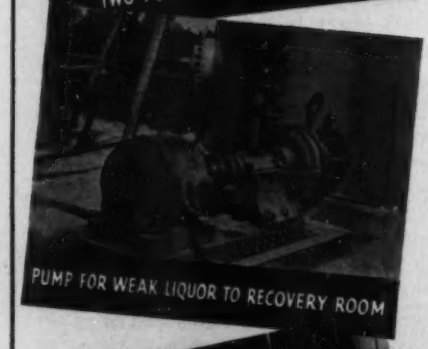
The mark put on that cypress is SCMA. That is lumber which has been inspected by an official Association inspector and identified as Tidewater Red Cypress, even though not from an Association mill. That mark is acceptable to the Government. If one mark or the other, either SCMA or the arrow symbol, is not on a piece of cypress, there is not too much chance that it is actually the oily Tidewater Red Cypess.

After you have made sure you have gotten the correct variation of the species for the job, then you have to make sure you have the right grade for your particular application, because there are a half hundred grades of cypress. So every piece of cypress is grade marked.

Today there is no excuse for any lumber

ANOTHER SOUTHERN MILL GOES WARREN!





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Why WARREN?

Because Warren Paper Mill Pumps not only stay with their jobs and protect against costly service interruptions but they do their jobs, year after year, at consistently low operating and maintenance costs.

For low pumping costs today and tomorrow, write Warren into your pump specifications.

WARREN STEAM PUMP COMPANY, INC.
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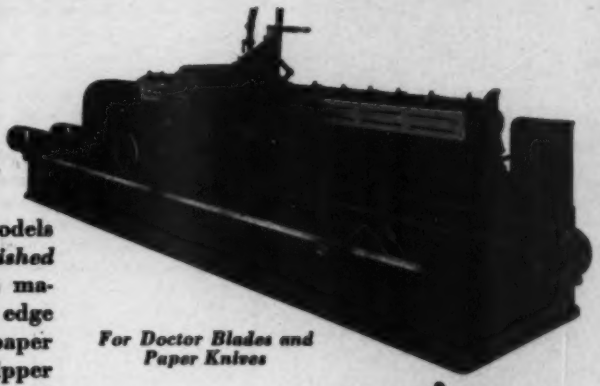
THE VALUE OF *proved* SUPERIOR SERVICE



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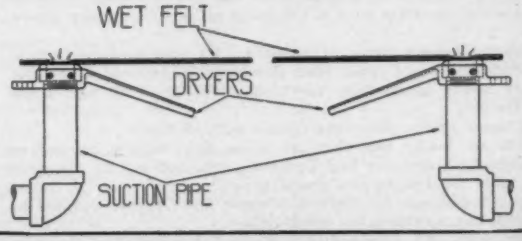
For Slitter Knives

Superior, *proved*, service was never better exemplified than in these two machines, definitely establishing the better grinding standards for slitter knives, paper knives and doctor blades, which are now becoming the standards of the industry through the development and wide adoption of these machines.

Superior, economical, proved. Developed by the pioneers in the industry. Complete catalogue sent free upon request.

COVEL-HANCHETT CO.—Big Rapids, Mich., U.S.A.

Something New



THE *NIKS* FELT EDGE DRYER

INCREASES useful life of felt; helps prevent excessive wear.

PREVENTS edges of press roll from wearing down faster than rest of roll.

ALLOWS as much weight to be placed on an old felt as on a new felt.

PREVENTS crushing at edges.

KEEPS edge of felt dry.

These dryers are operated by piping to present vacuum pump through a small diameter pipe. Very little air is required.

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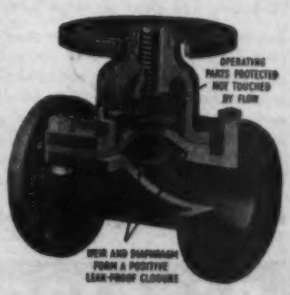
WHY fuss with valves that need constant attention and replacements! The Hills-McCanna Saunders' Patent Valve fits into practically every service in Paper and Pulp Mills. It overcomes the common difficulties of clogging, wire-drawing and corrosion encountered with valves of conventional design. No gates, discs or metal-to-metal seating arrangements are used. No stem-packing is necessary. They are a definite aid to reduced piping costs.



Hills-McCanna Co.
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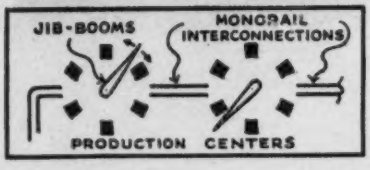

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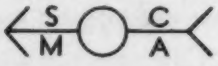
yard in any part of the United States catering to the paper mill trade to furnish anything but trade-marked and grade-marked cypress. If you were to order tanks, tubs, vats, etc., from a machinery manufacturer or tank maker, all these marks are going to be milled off in fabrication, end trimming, etc. For that reason, reserve the right to have these tanks inspected (or you can say this beater tub or this head box or whatever it is) by an official inspector of the Southern Cypress Manufacturers' Association and to reject them if not found to be made to specifications.

When you buy a tank or a tub or a vat which you are going to line with copper or with any other non-porous material, your natural inclination is to drop to a cheaper grade of cypress or a cheaper species of wood, figuring that your wood is only a foundation for the lining.

The cypress people have a grade which they recommend for that purpose. It is No. 2 Common All-Heart Tidewater Red Cypress, each piece grade marked by the symbol SCMA to identify it as Red, H2CM, to identify the grade of Heart 2 Common, and trade marked by the arrow symbol,



if you want Association lumber; otherwise, leave that last phrase off.

A knot might not look too good in a lined tank, but it doesn't make any difference as far as durability is concerned. When you put a hood or a cover over a beater tub or over a tank to keep in splash, you don't care anything about the appearance of it; you want a piece of wood that will not decay and a piece of wood that will stay in place; once again, No. 2 Common All-Heart Tidewater Red Cypress.

Cypress is a softwood. It will not stand extra heavy trucking. However, there are certain places in some mills where floor trouble is decay rather than wear. Where that is true, we recommend No. 2 Common All-Heart.

Where you have sub-floors and intend to put a hardwood facing like maple over them and you want a sub-floor which will not decay, we once again recommend this low-priced, durable grade of cypress.

When you use cypress for the main facing for the floor itself, or where you use it as a platform or as a catwalk, put the bark side up. By putting the bark side to the top, we practically eliminate grain raising and reduce shredding and splintering to a minimum.

Paper mill roofs have always been a problem. We never recommended cypress in years gone by because until recently the only grade we had that would do the job satisfactorily cost about five times as much as you generally pay for a roof.

About ten years ago we started experimenting with a tight knotted grade of all-heart oily cypress. As far as we can find

SPECIFICATIONS FOR PAPER MILL CYPRESS

For suction box sides and bottoms and for unlined tanks, tubs, stock rifflers, chests, boxes and vats, etc., that are bought ready-made from a manufacturer, and that must be "drop-tight", specify: These tanks are to be made of Tank Grade (All Heartwood) genuine Tidewater Red Cypress, as per the latest grading rules of the Southern Cypress Manufacturers' Association. Each piece shall be band sawn and bear the SCMA Brand of the Southern Cypress Manufacturers' Association to identify the lumber as Tidewater Red Cypress. We reserve the right to have these tanks inspected by an official inspector of the Southern Cypress Manufacturers' Association and to reject them if not found to be made to the above specifications.

When you buy the lumber for these items for fabrication by your own carpenters, the specifications for the lumber should read: Tank Grade All Heartwood Tidewater Red Cypress, each piece grade marked by the symbol SCMA—TNK and trade marked by the arrow symbol.

For acid washers and vomit stacks: Use Tank Grade outlined above.

For tanks, boxes, wet broke trucks, etc., that are to be lined with a non-porous lining: #2 Common All Heart Tidewater Red Cypress grade marked by the symbol SCMA—H2CM and trade marked by the arrow symbol.

For hoods and covers: #2 Common All Heart Tidewater Red Cypress, marked as above. Also use this grade for partitions for stock rifflers.

For clay mixing tanks use: #2 Common All Heart Tidewater Red Cypress, marked as above.

For floors, platforms and sub-floors where decay conditions are present: #2 Common All Heart Tidewater Red Cypress, marked as above. On all floors and platforms, be sure to put the bark side up, or to put the bark side to the wear surface.

For roofs: #2 Common All Heart Tidewater Red Cypress marked as above with #1 85% Heart Timber grade Tidewater Red Cypress being recommended for joists, stringers, and beams.

For screen vats, or shaker vats: Tank grade Tidewater Red Cypress as outlined and marked previously.

For couch rolls: Clear Heart Tidewater Red Cypress, grade marked by the symbol SCMA—CLH and trade marked by the arrow symbol.

For mill sash: Clear Heart Tidewater Red Cypress, marked as above.

For beater washer sash: Clear heart Tidewater Red Cypress, marked as previously outlined.

For Window Frames use: #1 Common 85% Heart Tidewater Red Cypress grade marked by the symbol SCMA—85%H1CM and trade marked by the arrow symbol.

For baffles for stock rifflers use: #3 Common all Heart Tidewater Red Cypress grade marked by the symbol SCMA—H3CM and trade-marked by the arrow symbol (illustrated above).

Always reserve the right to have an inspection by an official inspector.

out, this grade of cypress, both from practical tests and from theoretical experiments, should last indefinitely in a roof. That is the grade of No. 2 Common All-Heart Tidewater Red Cypress.

Where you have roof trouble, you have sash trouble. When you install sash, install Clear-Heart Tidewater Red Cypress sash. If you wish to work a knotty grade of cypress into sash and get exactly the same durability, you can order a lower priced grade of All-Heart Tidewater Red Cypress, trade marked and grade marked of the grade with whatever size knots and other defects you wish to permit.

There are specifications (see accompanying presentation), as far as we know, for every purpose in the paper mill for which you use cypress. If you follow these specifications, you will get good results; but I would like to impress on you that you cannot order just "Cypress," you cannot order "Clear Cypress," because those grades don't mean a thing in the paper mill. You have to order the grade which the cypress people recommend for each particular purpose.

Current Methods of Purifying Water for the Pulp and Paper Mill

A. F. McCONNELL
The Permutit Company

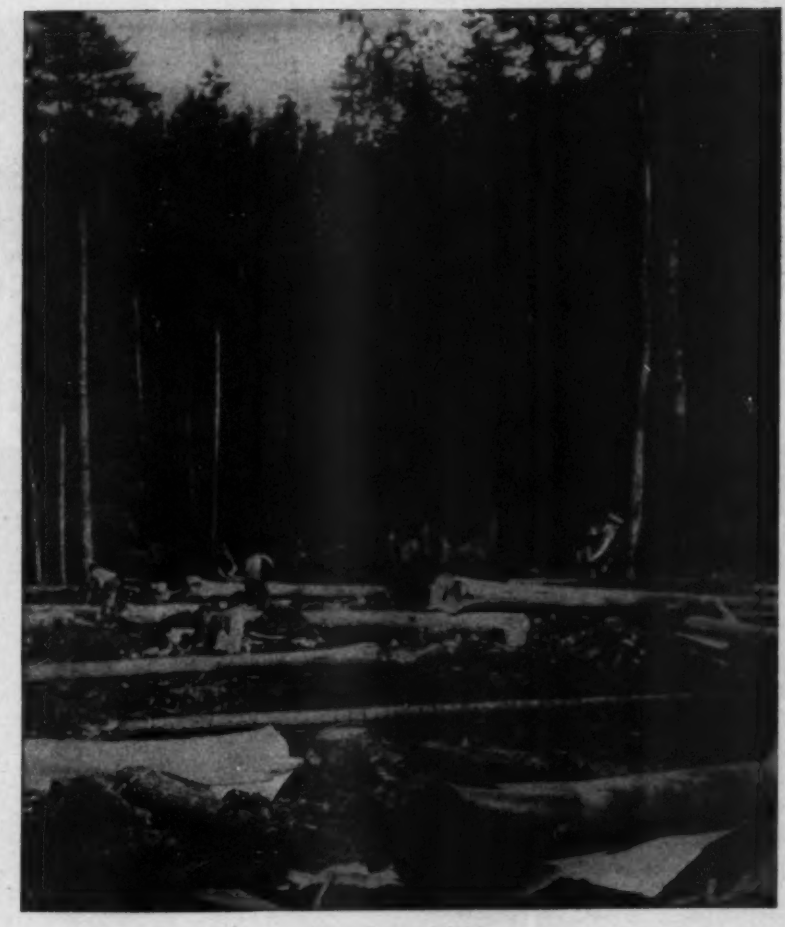
Paper is a water carriage process, but some waters are not even fit to be vehicles. Water cannot be eliminated from the papermaking process, therefore, unsuitable waters must be made at least tolerable if it is impracticable or too costly to completely purify them.

A satisfactory water supply is one of the considerations that dictates the location of a paper mill and generally, the raw water supplies of most paper and pulp mills are not heavily polluted by either the natural scoured off materials of erosion or by the wastes of industry. Some mills, however, have unsatisfactory supplies, either because the water is naturally unsatisfactory or because the water has changed since the founding of the mill.

The objectionable waters encountered most frequently in the paper industry are those that are turbid, those that are highly colored and those that contain appreciable amounts of iron, manganese, organic matter and hardness.

Turbidity removal is accomplished by one of two processes; the choice usually being dictated by the amount of suspended material present. With slight amounts, the water may be treated with alum and strained through sand filters. When larger amounts are present, a coagulant, usually alum, is stirred up with the water, after which the water flows into a tank or basin where the velocity is so reduced that the coagulated dirt will sink downwardly through the water to become a sludge at the bottom while the clarified water is drawn off from the top and then passed through sand filters.

Color removal is accomplished in the same way as turbidity removal but closer regulation is required of the chemicals fed. Alum is the coagulant most frequently used. The alum floc forms a tremendously ex-



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tended surface and the color collects in the alum floc and the color, alum floc and any turbidity that may be present is precipitated downwardly as a sludge in the settling basin.

Iron removal methods depend on how the iron occurs in the water. If fully oxidized it can usually be removed by settling and filtration. If partially or wholly in solution it may be removed by aeration, followed by settling and filtration. If iron is present in organic or colloidal form, as in many colored, surface waters, it may be removed by coagulation with alum followed by settling and filtration. Soluble ferrous iron in clear, deep well waters may be removed, together with the hardness, by the base exchange action of the zeolite water softener.

In general, manganese is more difficult to remove than iron and requires higher *p*H values. It oxidizes more slowly and requires long detention periods in basins, together with addition of special reagents for complete formation of mangenic precipitates; often its presence also causes the iron to resist oxidation and precipitation.

Some recent developments have taken place in equipment for the removal of obnoxious substances from water and the most interesting is the reduction in settling time obtained as a result of better methods of floc formation and the use of the adsorbent powers of previously formed sludge.

By adequate mixing with power driven mixers and the use of accurate chemical feeds and sludge removal, the settling time in the new settling basins has been reduced from the four or more hours for the old type basins to two hours or less.

In the Spaulding Precipitator where the products of previous reactions are continuously mixed up with the entering raw water and where a sludge blanket is maintained, better results than ever before obtainable are secured with a total combined mixing and settling time of 60 to 70 minutes.

If desludging equipment is omitted, space must be provided in the settling basin to retain the sludge until the basin is removed from service for cleaning, and to avoid the necessity of frequent shutdowns, ample space must be provided for this hoarding of waste. This requires deep basins, 15 to 20 feet or more in depth. With sludge removal equipment basins can be 8 to 12 feet in depth and produce a better water.

In the Spaulding Precipitator, sludge is continuously mixed with entering raw water but since sludge is being continually withdrawn and sent to waste, old sludge does not accumulate and the bleeding keeps the sludge fresh through continuous depletion of the precipitates.

The time of mixing in the mixing zone of a Spaulding Precipitator is from 30 to 40 minutes. The time of detention of the water being treated in the filter zone, that is in the settling region, is from 20 to 30 minutes.

Any of the usual chemical feeders are used, and these feeders may be located either at the top of the precipitator or at ground level. The choice of feeder depends upon the chemicals to be fed, the volume of water to be treated and the degree of accuracy of feed required.

The Spaulding precipitator is used for coagulation and settling of turbid waters and for the removal of hardness, iron and manganese, and with special modifications for the removal of silica and fluorides from water by adsorption.

There are two general types of sand filters; pressure and gravity.

Pressure filters contain a bed of filter sand supported on a bed of coarser material, graded in size, that in turn rests upon a collecting system and all are contained in a steel shell fitted with the necessary valves to send the water downwardly through the sand during filtration and upwardly during backwashing.

Pressure filters are used where it is desired to save repumping, for the filtration can be performed at any pressure.

Gravity filters contain the beds of filter sand and supporting material in rectangular concrete box or in cylindrical wood or steel tank. These, like the pressure filters, are fitted with the needed valves for passing the water into the filter and into the top of the sand bed during filtration and sending the water into the bottom and upwardly through the sand and into wash troughs during backwashing.

Water purification technique has advanced step by step with the development of high pressure boiler plants.

Hot lime and soda softeners that combine softening, heating and deaerating until all traces of oxygen are removed are available for boiler plants where this combination is most desirable.

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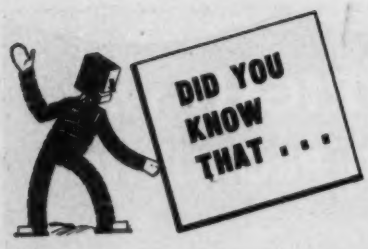

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The equipment used, when treating water for high pressure steam boilers, usually consists of: primary heater, chemical feeds, settling tanks, deaerating heater, and filters. For low pressure boilers, the deaerating heater is sometimes omitted. Exhaust steam is used to heat the raw water.

Zeolite softeners have been available for thirty years. In these softeners the zeolite, which is in granular form, is supported on a bed of gravel in a steel shell. This shell has a collector and distributor at top and bottom and the required valves for passing the water downwardly through the zeolite during softening and upwardly during backwashing. When the softener has completed the portion of the operating cycle where the hardness is removed from the water, the unit is cleansed by backwashing and then regenerated by flushing a brine made from common salt, downwardly through it, which restores the zeolite to its original capacity for effecting water softening.

The latest type of zeolite, carbonaceous zeolite, or Zeo-Karb is unaffected by acids and can therefore be regenerated by acids instead of salt and when thus regenerated, the carbonaceous zeolite exchanges hydrogen for the lime, magnesium and sodium in the water. It thus eliminates bicarbonate and gives an effluent of low total solids.

The carbonaceous zeolites remove sodium, magnesium, calcium, iron, aluminum and manganese from solution in water.

The non-siliceous character of this zeolite makes it suitable for softening water low in silica, since low silica waters are particularly aggressive to siliceous zeolites. The non-siliceous character of this zeolite makes it particularly suitable for the treatment of feed water for high pressure boilers where even slight increases in silica in the water are undesirable.

This is the seventh installment of abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 17-20, 1941. Previous installments appeared in the March, April, May, June, July, and August issues, and will be continued until abridgments of all available papers presented at this meeting have been published.

Economic Losses Due to the Activities of Microorganisms

J. R. SANBORN[1] and
RAPHAEL A. GILLOTTE[2]

Nearly all of the activities of microorganisms in pulp systems mean economic waste. In a few cases mills have attained a control that practically eliminates microorganisms from pulp systems.

The method of procedure employed in the study of microbiological problems of mills includes: (1) the making of bacteriological counts at selected points throughout the system, (2) determination of types of microorganisms present and their significance, and (3) suggestions as to specific remedies.

Through systematic analyses of samples of process water and stock taken at focal points in a mill system, sources of microbiological growth and decompositions may be revealed and the effectiveness of control measures satisfactorily indicated. Studies such as these are of practical benefit in prompt determination and control of causal agents responsible for many troublesome conditions.

Several mills manufacturing high-grade paper and paperboard for the packaging of perishable foods have secured substantial reductions in bacteriological counts throughout pulp systems. They maintain low counts and periodically carry out bacteriological tests of water supplies and stock in order to determine if development of microbiological growth at all focal points is being prevented. Some of these mills have achieved a control that practically eliminates microorganisms from the mill systems others are making considerable progress toward this goal.

In addition to the making of total counts for the purpose of detecting the points at which microbiological growth in mill systems is taking place, it is desirable to know the identify of the organisms responsible for slime growths and decompositions. This work is accomplished with the aid of special media and microscopic examinations. In order to secure more comprehensive knowledge of the types of microorganisms found in pulp, paper, and paperboard mills, additional tests necessary for identification of species, have been employed in this work. Detailed studies of types reveal a diversified microbiological flora.

Due to incomplete knowledge as to proper classification of certain groups of microorganisms that comprise the mill flora, it is impossible in same cases to give these forms precise designations. Speaking generally, the organisms most frequently encountered may be grouped as follows:

(1) Coliform types belonging to the general *Escherichia* and *Aerobacter*. Intermediate types also occur.

(2) Nonspore-bearing bacterial species belonging to the genera *Micrococcus, Pseudomonas,* and to the poorly defined genera *Achromobacter, Flavobacterium, Alcaligenes,* and *Cellulomonas.*

(3) Spore-bearing bacterial species such as *Bacillus subtilis* and its slime-forming relative *Bacillus peptogenes; Bacillus mesentericus* (syn. *Bacillus pumilus*), *Bacillus megatherium, Bacillus cereus, Bacillus mycoides,* and various thermophilic and anaerobic types.

(4) Filamentous mold-like bacteria belonging to the genus *Actinomyces,* and

(1) and (2) New York State Experiment Station, Geneva, N. Y.

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special groups such as the iron bacteria that sometimes develop in water supplies.

(5) Pseudo yeasts and yeast-like fungi—*Torula, Oidium, Monilia.*

(6) Filamentous fungi of the mold type including *Penicillium, Aspergillus, Citromyces, Fusarium, Cephalosporium, Botrytis, Trichoderma, Alternaria, Cladosporium,* and *Spicaria.*

Many other fungus types occur more or less frequently such as *Acrostalagmus, Chaetomium, Trichothecium, Thamnidium, Gliocladium, Mucor, Torulopsis, Clonostachys, Sporotrichum* and *Stachybotrys.*

Other groups of organisms such as certain microscopic plants known as algae, developing periodically in some raw water supplies, cause trouble only spasmodically, usually infrequently, and are not ordinarily considered as members of a typical mill flora. The blue-green algae present at times in fresh water may product objectionable discolorations of pulp. Odor problems are occasionally traced to algae.

The various groups of organisms enumerated above contain species that produce slimes others that destroy cellulose fiber, mildew stock, discolor pulp and paper products, rot felts, aggravate corrosion difficulties, or form objectionable odors in pulp systems.

If the slime and stock discoloration problems, selected at random, were studied along with the microorganisms causing these conditions, it would be found that slime-forming coliform-like bacteria, slimy varieties of the *Bacillus subtilis-Bacillus mesentericus* groups, the yeast-like organisms *Oidium* and *Monilia,* and certain fungus genera such as *Aspergillus, Penicillium,* or *Trichoderma* occur frequently. In a number of instances equally serious difficulties may be caused by other groups of microorganisms including *Cladosporium, Chaetomium, Botrytis, Cephalosporium,* or *Clonostachys;* that are encountered only occasionally. Fortunately the control measures that are effective against the types mentioned above, are proving helpful in eliminating organisms that are less common and not so well known. The slime-producing microorganisms tend, however, to be restricted to clearly defined groups for which fairly uniform control procedures are already being developed.

Nearly all mills utilize germicidal treatments. They all agree that fresh water, as used, shuld be in a satisfactory condition. Many mills have discovered that the maintenance of an excess of germicide in fresh water enables them to use this water as a bacteria-killing solution which is unusually effective in washups and in sterilizing cleaned surfaces of equipment and piping, thereby preventing specific slime-forming organisms from immediately redeveloping on these surfaces. Many news and groundwood mills carry chlorine residuals varying between 0.5 and 2.0 p.p.m., depending upon local conditions and practicability. The bacteria-killing effect of chlorinated fresh water can be used to good advantage in preparing starch solutions, in sterilizing felts, and on showers. In other words, the beneficial effects of this bacteria-killing solution should be utilized wherever it is practical and feasible to do so. Mills make rather common use of this procedure. Newsprint mills, in particular, have been unusually successful in its applications.

Due to the readily fermentable character of groundwood, newsprint and groundwood pulp mills face microbiological problems that are quite different from mills that do not use or handle appreciable quantities of this pulp. The microbiological flora of groundwood is fairly specific and uniform. There are, however, considerable variations in the seriousness of the conditions produced and in the forms which these troubles may assume. Nevertheless, rather uniform control procedures have been developed by newsprint mills involving the use of heavily chlorinated fresh water. Due to the diversification and aggressiveness of the types of organisms that develop in these mills, it is frequently necessary to employ copper sulphate at one or more focal points of growth, such as white water chests, in addition to the straight chlorination or chloramine treatment of fresh water. Best control is secured when returned white water receives direct applications of germicides. Chloramines or pentachlorophenates are perhaps most generally utilized in white water systems, usually supplemented by small additions of copper sulphate.

Mills that utilize mainly bleached and unbleached chemical pulps have microbiological problems that are essentially different from those of the former group, but which bear directly upon efficient operation and high quality production. While these mills quite generally utilize satisfactory supplies of fresh water, they do not, as a group, carry as high a chlorine residual in this water as the former group nor do they use this supply so extensively as a bacteria-killing solution. These mills do, however, emphasize the use of chemical treatments in mill systems. The growth of microorganisms in returned white water is generally controlled and stock systems frequently receive applications of specific germicides. Calender water, size press solutions, starch solutions and broke stock are handled and treated in ways which prevent the development of microorganisms. Cleaning and sterilizing procedures are applied regularly and systematically to size press and calender water boxes, piping, save-alls, and all other parts of the process that are conducive to microbiological growth.

Mills that bleach their own stock and have satisfactory fresh water supplies are in a particularly favorable position to establish good control procedures. On the other hand, mills that obtain a considerable portion of the stock used from other mills, converting plants or dealers are usually forced to contend with microbiological growths or miscellaneous contaminations that may be introduced with these materials. This situation, aggravated as it is by present economic conditions, has led to the development of many different methods for the elimination of undesirable microorganisms in stock. These procedures provide considerable flexibility in their applications. It is sometimes necessary to take extraordinary precautions to prevent the development and spread of mildew, to apply germicidal materials at beaters or beater chests, or to use specific control measures elsewhere in the system. The pulp going on machines frequently receives treatment and, in special cases, fungicides or chemical preservatives are applied in calender water boxes. Many mills use starch fairly regu-

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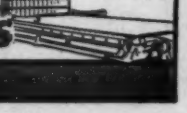

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● *Frederick Pump at Phil-Fibre Box Board Mills.*

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larly. This product is fermentable and special precautions should be employed in its preparations and use. It is recommended that mills purchase chlorinated starch, make starch solutions with water containing a germicide, and cook or hold these solutions at temperatures in the vicinity of 190 deg. Fahr.[4] When starch is used at fan pump or elsewhere in the system and when paper or paperboard is sized with starch, white water and broke containing this fermentable material are rendered particularly susceptible to bacterial growth. Specific germicides should be selected and applied with adequate knowledge as to the nature, origin, growth characteristics, and resistance of the causal organisms, keeping in mind that, following eradication, preventive measures should be established.

Use of Sveen Glue

P. M. LODDENGAARD[1] and
RICHARD TUTT, JR.[2]

Since the introduction of the Sveen method of fine fiber and filler retention in this country in 1936 [P. M. Loddengaard, *Tech. Assoc. Papers* 20:291-296 (June, 1937)] requests have come for information as to whether Sveen will work advantageously on a closed system.

To ascertain what the method will do if the system is closed, there should be a comparative run on the same sheet of paper with and without it. When everything is set up for the trial, immediately before any Sveen glue solution is turned on, water samples are taken from the headbox, trays, suction boxes, effluent from save-all, and frequently of water to the save-all. On cylinder machines water samples are taken from headboxes, vat overflow, and save-all effluent. Simultaneously with the taking of these samples a tear-out of the paper on the reel is secured to tie-in with them. A record is kept of beater furnishes including broke and/or slush stock. If any re-used water, carrying filler, from a service tank is being used on the machine or to drop beaters, samples of that are taken. Where such water, carrying filler, has been used off and on without any particular attention being given to its filler content, wide variations may occur in ash tests from time to time.

After the first set of samples have been taken the Sveen glue solution is turned on. Usually the first observation, particularly on heavily filled sheets, is an immediate slowing up of the sheet accompanied by a jump in weight and ash, indicating that the glue has taken up the rich solids in the circulating back waters. This is only temporary. The machine tender shuts off some stock and adjusts his weight, the system soon becomes leaner, but the ash still remains above normal. The next observation after this first surge is over, is that the sheet is freer on the wire, the drainage is more rapid. Frequently when trays are shallow they overflow with the excess water leaving the sheet, the sheet seems to dry easier and there is a drop in back pressure.

Whatever tendency there may have been toward two-sidedness in the finished sheet has been changed for the better, formation improved, more fines retained, and filler and color more evenly distributed through the sheet. Invariably the sizing is better. The duplexing or two-sidedness on colored sheets is materially lessened. Reductions in size and color furnish, as well as filler furnish are secured.

The increased retention of filler secured by using this method has reduced materially the rate of clogging wet press felts, hence less frequent necessity of washing.

In sizing tests by the ink flotation method before glue was used the reading would be 10 to 12 minutes, and with Sveen glue it would increase to 18 to 20 minutes. On a hanging sheet, it rose from 5 minutes to 11 minutes. On an unfilled sheet, hardsized, it rose from 18 to 35 minutes.

Sveen works regardless of machine *p*H. It has been run successfully on a machine where the *p*H was as low as 3.7 and on up the range to 7.8 with carbonate fillers.

Some mills using carbonate filler have felt it necessary to introduce alum to the stock at some point in the system to secure enough flocculation for any kind of retention at all. Glue has been introduced under such conditions and the alum eliminated, retention being every bit equal to that secured with alum.

(1) Bulkley, Dunton Pulp Co., (2) Peter Cooper Corps.

Requirements of Base Papers for Varnish Coatings

VICTOR A. RYAN, Research Director
Crown Cork & Seal Company, Inc.

Consideration will be given, herein, only to those papers which are treated with oleoresinous varnishes and subsequently baked at relatively high temperatures, such as the papers used for food closures and for electrical insulation. In these types of base papers, the baking temperatures encountered are rarely less than 280 deg. Fahr. and may run as high as 325 deg. Fahr., while the baking cycles run from 60 to 120 minutes, depending upon the number of coats of varnish applied. It is apparent that, in a paper of this type, heat resistance is the property of paramount importance.

At the present time there is no standardized method of test for the measurement of heat resistance which undoubtedly accounts for the limited source of supply for varnishing grade papers. New sources of supply will not be available until some test method is adopted by the industry which will satisfactorily indicate the resistance of paper fibers to embrittlement when subjected to high temperature baking operations.

The Weller test, which was first described by Bachmann [A. E. Bachmann, *Paper Trade J.* 80, No. 8:51 (1925)] and later studied and analyzed by Peek and Finch [Peek, R. L., Jr. and Finch, J. M., *Paper Trade J.* 88:56-62 (Feb. 7, 1929)] has been found to be a satisfactory method of measurement for the heat resistance of papers. After a preliminary study of the test, the author has been using it, with certain modifications, for the past several years with remarkable success, although he has not been able to have it adopted by suppliers.

The author prefers to group tensile and brittleness strength tests together in a method which he designates as the flexibility index test. The result of this test is expressed in a simple mathematical formula which gives a relative value satisfactory for practical purposes.

The flexibility index is computed from the formula:

$$\text{Flexibility Index} = \frac{B}{2T}\ 100$$

when B is the mean brittleness strength, and T is the mean tensile strength.

The flexibility index test is simple and can be carried out in a comparatively short time; it is a practical, dependable relative measurement of the flexibility of papers.

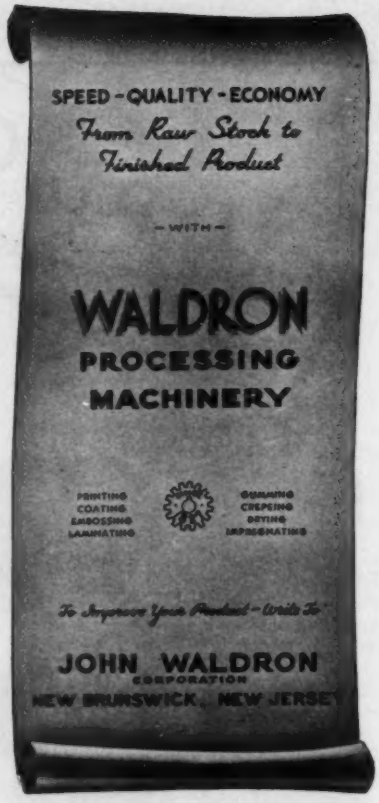
All papers tend to brittleness in some degree on baking, and, inasmuch as increasing brittleness is accompanied by decreasing flexibility, it is evident that the ratio of flexibility *after* heating to the flexibility *before* heating is a relative measurement of the heat resistance of papers.

The heat resistance index is then computed from the formula:

$$\text{Heat Resistance Index} = \frac{FI - a}{FI - b}\ 100$$

when *FI-a* is the flexibility index after heating, and *FI-b* is the flexibility index before heating.

The magnitude of the baking temperature has a decided effect on the flexibility index. On the same grade of paper, the low acid (high *p*H) sample, is decidedly less effected than the high acid (low *p*H) sample, showing that high acid papers tend to brittleness more than the low acid ones. In any



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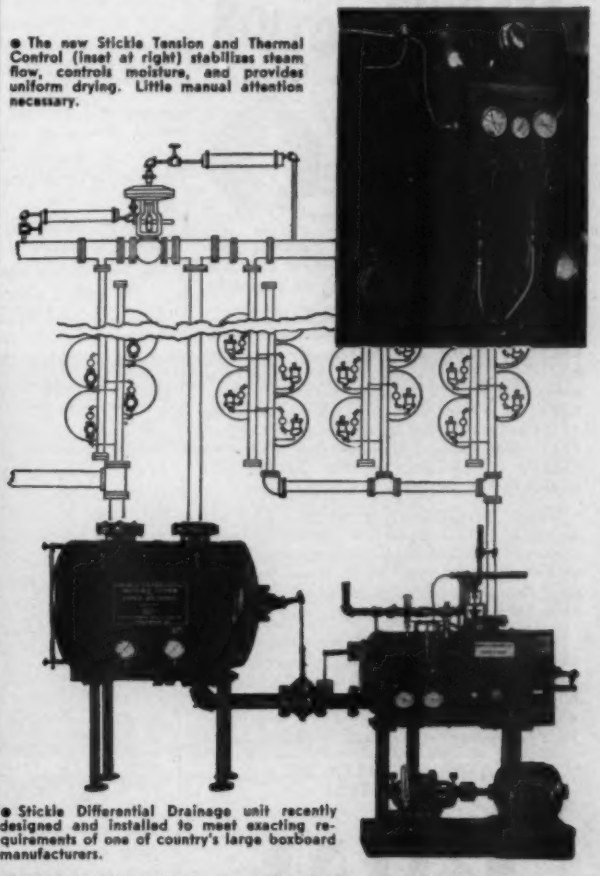
An investment in Stickle Equipment pays big dividends.

● The new Stickle Tension and Thermal Control (inset at right) stabilizes steam flow, controls moisture, and provides uniform drying. Little manual attention necessary.



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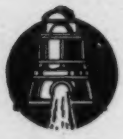

CLATTERING air hammers, roaring bulldozers and clanging well casing noise dins the air throughout the country. Defense projects are being rushed—production is going up—up—and up! But the entire program is moving on a simple life necessity—Water!

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Layne-Bowler New England Corp.	Boston, Mass.
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given acidity and baking temperature, the sulphate papers are less effected than the sulphite, showing that fiber composition is a contributing factor to brittleness equally as important as the acidity. Practical experience has determined the fact that papers with less than 80.75 flexibility index, after baking, are unsatisfactory for high temperature varnishing work.

There is a well co-ordinated relation between acidity, as represented by the *p*H value, and heat resistance; and *p*H value is indicative of heat resistance only when it is a question of papers of similar composition. With papers of dissimilar composition, the *p*H does not indicate heat resistance.

It has long been known, and believed, that the amount of varnish absorbed by paper is in inverse ratio to the Gurley density. Actual practice has confirmed this fact.

We know from practice that the brittleness of varnished papers increases with the amount of penetration of varnish into the fibers and interstices of the sheet. Therefore the flexibility index of a varnished paper will decrease with increasing penetration of varnish, which establishes the fact that the amount of varnish absorbed by paper is in inverse ratio to the flexibility index.

With increasing density of the base paper, less varnish is absorbed and increasing flexibility of the varnished paper results.

The lack of a method of measurement for flexibility and heat resistance has been responsible for the fact that complete requirements could not be set up covering base papers for use in varnishing because, without it, there was no way to predict or indicate behavior in a baking operation and papers could not be satisfactorily specified.

It is now felt that the flexibility index test and the heat resistance index test can be correlated with actual baking behavior and can be used in conjunction with the conventional paper tests now in use to set up complete requirements of base papers for varnish coatings.

In the preparation of base papers for varnishing, nothing but pure pulps should be used. Groundwood or sulphite pulps should never be used in the composition; they not only impair the mechanical strength but greatly reduce the heat resistance. For best results, "varnishing krafts" should be made from spruce sulphate pulp; pine sulphate pulp has a deleterious effect on the heat resistance, greater in extent than sulphite pulp.

A great number of electrical papers are unsized, while some of them and all of the food papers contain sufficient sizing to meet weight, strength, and, especially, Gurley density requirements. Where sizing is necessary, nothing but pure alum-rosin should be used. Mineral fillers and other loading materials will reduce flexibility and heat resistance and, in the case of electrical papers, will impair the electrical properties. It is customary for the user to specify an ash content of not more than 1.0 per cent, and in special cases 0.5 per cent, in order to keep inorganic fillers out of the furnish.

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INTERNATIONAL WIRE WORKS

Surface or tub sizes should never be used; they prevent proper penetration and anchorage of the varnish.

Thickness must be controlled within the narrowest limits.

The moisture content should not exceed 4 per cent.

The density depends entirely upon whether a penetrated or nonpenetrated type of paper is desired. The proper density is usually determined by trial runs before it is definitely specified. Electrical papers usually run between 65 and 150 seconds per 100 cc. while, in the food papers, the regular supercalendered krafts are usually specified with a 300 seconds minimum and the special water-finished kraft with a 550 seconds maximum.

Varnishing papers should be as free from acid as possible in order to insure against embrittlement on baking. It is therefore desirable to include *p*H requirements in a specification. A minimum *p*H value of 5.8 will satisfy the requirements of food papers. Electrical papers should be as close as possible to the neutral point (*p*H 7.0) but in no case less than 6.2. The *p*H specified will apply to the finished sheet of paper and not to the beater.

All papers should have an initial flexibility index of not less than 85 and, after baking 90 minutes at 290 deg. Fahr., all, except the special water-finished kraft for food closure purposes, should have a heat resistance index of not less than 95. The water-finished kraft should be specified at minimum 90.

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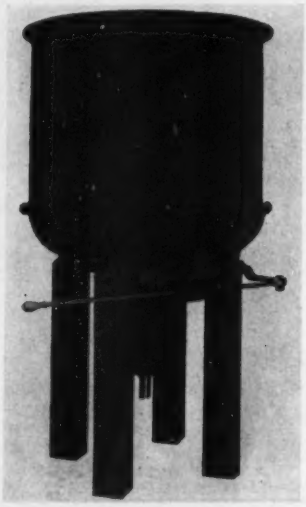
NEW EQUIPMENT AND SUPPLIES

10-Ton Hydrapulper

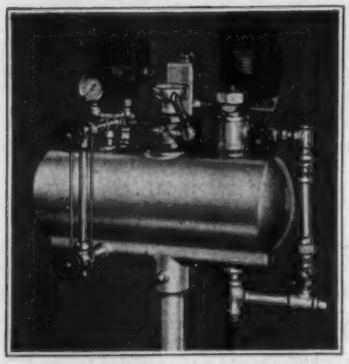
Dilts Machine Works, Fulton, N. Y., Division of the Black-Clawson Co., has announced a *Hydrapulper* with an output capacity of 10 tons per 24 hours. The pulper is 4 ft. in diameter, and 10 ft. in



height. It has a 150 gallon capacity at operating depth. Specially designed for applications where a small capacity is needed, the manufacturer suggests it for application in mills making molded paper products and for laboratory usage.

Steam System Conditioning Process

Pressure-Jet Corp., 631 E. Center St., Milwaukee, Wis., has announced a process for the corrective treatment of a steam system beyond the boiler. The process, known as the *Pressure-Jet Process*, includes a specially compounded fluid for the treat-



ment of the steam and a mechanical unit for injecting it into the steam system.

The manufacturer states that the fluid, which is essentially alkaline in character, is non-caustic; and that it is non-injurious to ferrous or non-ferrous metals, packings, or gaskets.

In operating the system, an automatic liquid level switch of the Pressure-Jet unit controls current to an electric heater element which heats the fluid within the unit to temperature up to 350 Fahr. and pressures up to 150 lb., turning the current "on" when the unit is filled and "off" when the treatment has been discharged. A pressure control switch maintains the desired pressure. Rate of discharge is controlled by adjusting a needle valve. Discharge, through a copper tube, takes place under high pressure through a small orifice into the steam main, where atomization and flashing of the fluid occurs, permitting the fluid to be carried to all parts of the system with the steam.

The treatment, according to the manufacturer, separates existing scale, sludge, rust or other products of corrosion into very minute particles which are held in suspension, and which flow-off with the condensate; neutralizes the acidity in the system; reduces CO_2; and prevents further rusting or corrosion. Among numerous applications, the manufacturer suggests the use of the process for keeping the interior surface of paper machine dryers free from scale and incrustation.

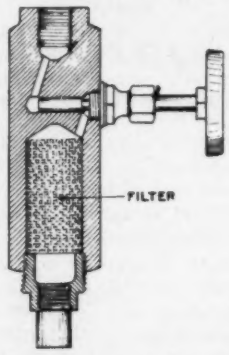
Air-Power Agitator

Eastern Engineering Co., 45 Fox St., New Haven, Conn., has announced an air-powered, portable, batch mixer suitable for average jobs utilizing 50 or 100 gallon containers. The mixer includes a ball-

bearing, equipped, ¼ hp. air motor (maximum speed—2000 r.p.m. on 100 lb. pressure), an exhaust silencer for motor, a stainless steel shaft coupled to motor through a nickel plated tube-type coupling, a 4 in. diameter nickel plated bronze propeller fastened to shaft end, and an adjustable clamp for attaching mixer to edge of container. The speed of the motor can be varied by reducing the air pressure. The manufacturer states that the mixer is explosion-proof, and can be operated without danger in the presence of serious fire hazards.

Pulsation Dampener for Governors and Gauges

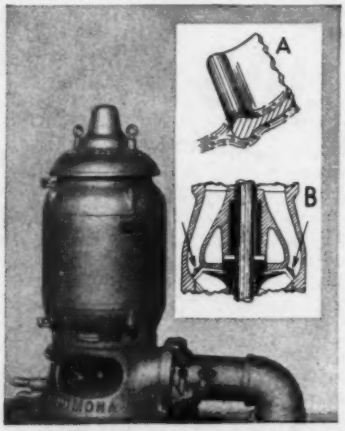
J. A. Campbell Co., 645 East Wardlow Rd., Long Beach, Calif., has announced a pulsation dampener for governors and gauges. The device, known as the *Campbell Micro-Bean*, consists of a solid brass body, a filter for protection from foreign matter, and a valve for effecting very sensitive control of the shut-off. According to the manufacturer, the device can be installed on the pressure line to the diaphragm of a pump governor for the protection of the pressure gauge mechanism and tube, also the spring, diaphragm and



stem packing. The manufacturer also states that the device, universal in application for varied purposes up to 3000 lb. pressure, will give any degree of stabilization desired by merely turning the valve.

Vertical Turbine Pump Improvement

The Pomona Pump Co., St. Louis, Mo., and Pomona, Cal., has announced fundamental design changes in the guide vanes of its line of Pomona Vertical Turbine pumps. The new vane shape, bulbous at the advanced end, according to the manufac-



turer, increases over-all operating efficiency as much as 10 per cent, end, in addition, permits the high efficiency to be maintained over a broader range of capacities than is possible with ordinary turbine pumps. A pump of older design may take advantage of the new design by substituting a new bowl assembly for the old one.

Vibration-Service Lamp

A new lamp, the construction of which protects the filament from vibration and jar, has been announced by the Wabash Appliance Corp., 335 Carroll St., Brook-

Put a Bauer Prepared Sheet Through Laboratory Tests!

- The next time you see a sheet of paper prepared on Bauer double-disc pulpers, analyze it. You'll notice three things:
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Get these results on your papers by specifying Bauer pulpers. Built for kraft knotter and screen rejects, semi-chemical and semi-sulphite pulps, ground wood screening, boxboard, and container. Two sizes are available . . . 24″ and 36″ . . . each with a wide variety of disc patterns.

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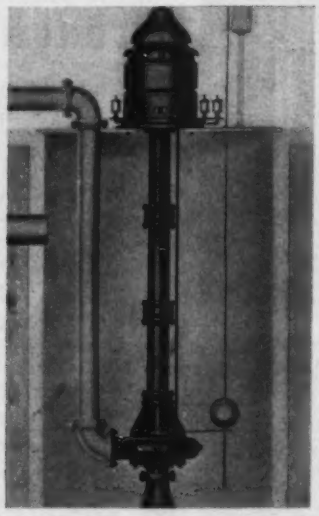
lyn, N. Y. Four molybdenum springs welded to six flexible filament supports protect the filament. A nickel neck reflector, welded to a seventh support, serves to reflect light away from the neck of the bulb, while a center piece of mica insulates the wire supports from the disc and helps keep heat away from the base.

The lamp will be made in 100, 150, and 200 watt sizes in five separate voltages from 110 to 130 volts, and in four separate voltages from 220 to 250 volts. Standard finish will be either inside frosted or clear. The average burning life, according to the manufacturer, will be 1,000 hours.

Sump and Bilge Pump

Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, has announced a nonclogging centrifugal pump, the *5410SS*, which has been designed specifically for intermittent-duty sump or bilge pumping, wet pit, or submerged service. The pump is designed for suspension from the floor



level into a sump or bilge, multiple pump units being suspended in one sump where large variations in flow requires reserve pumping capacity. The pump is available in 2, 3, 4, and 5 inch sizes for capacities up to 1400 g.p.m., for heads up to 120 feet, and for settings up to 25 feet.

Glass Electrode pH Indicator

Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, has announced a glass electrode pH indicator which embodies a rugged deflection meter, a thermionic amplifier of high stability, a manual temperature compensator, self-contained stable

electrodes, and a mahogany case. The indicator, according to the manufacturer, retains full accuracy (± 0.1 *p*H) up to 85 Fahr. in atmospheres of 95 per cent relative humidity. Measurements are made simply by pouring a sample into its self-contained beaker, and reading *p*H directly from the meter scale.

Spray Kit for Burns

Mine Safety Appliances Co., Braddock, Thomas and Meade St., Pittsburgh, has announced the new *M.S.A. Foille Spray Kit for burns*. The kit combines a supply of Foille (a therapeutic preparation for the treatment of all types of burns); a high pressure spray gun which screws onto the jars of Foille; suitable dressings; a sterilized, bleached muslin sheet; ammonia inhalants tubes of Foille for small burns, and tubes of castor oil for the eyes; a camel hair brush for applying Foille if desired and a pair of bandage scissors. The entire outfit is contained in a waterproof and dustproof steel case.

Foille, according to the manufacturer, affords a characteristic absence of infection, and speeds the process of tissue reconstruction.

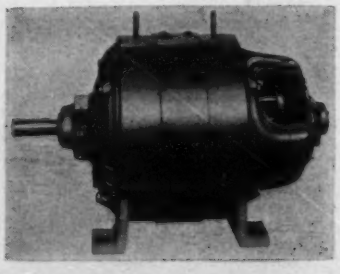
Industrial Multi-Breaker

Cutler-Hammer, Inc., Milwaukee, Wis., has announced a new industrial multi-breaker which it states costs little more than a type A switch. The breaker is fuseless. It has bi-metallic strip actuation, visible trip

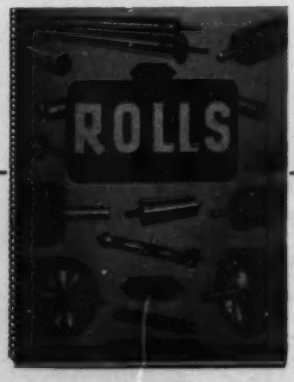
indication, and trip free lever. It is quick make and quick break, with a rated capacity of 230 volts from 15 to 100 amperes, available in 3 pole, 3 pole solid neutral, or 4 pole solid neutral types. The breaker is completely enclosed and semi-dust-tight.

Single Unit Exciter and Regulator

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has developed a single unit regulator-exciter combination, designated as the *Regulex exciter*, for automatically holding constant output on d-c. and a-c. machines. The Regulex consists of a differential amplifier for controlling the excita-



tion on d-c. motors and generators to give constant voltage, current, speed or tension. The unit is being developed for all sizes of d-c. machines, and, according to the manufacturer, it will be applicable to a-c. synchronous motors, generators and condensers, and to constant tension drives in paper mills.



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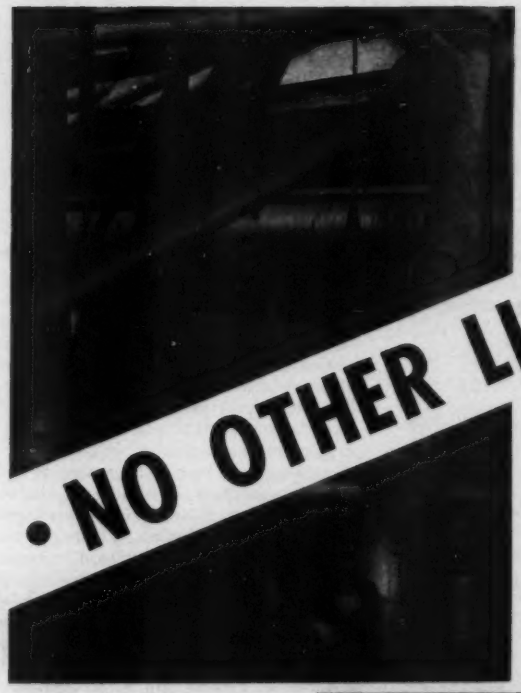

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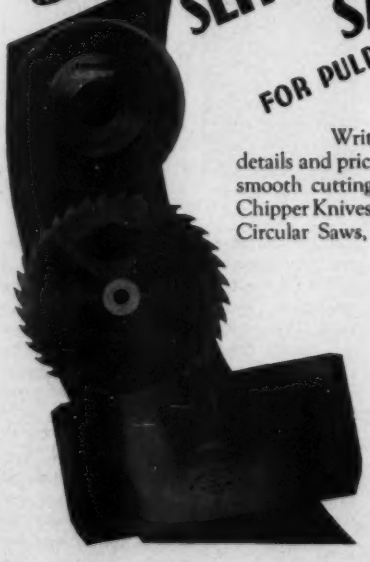

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Sulphite Waste Liquor as a Source of Energy

Starting with the principle of electromotive combustion cells devised by Baur and his co-workers (Baur and Preis. *Z Elektrochem. 44*, 695, 1938, the author discusses a possible electromotive combustion cell, in which waste liquor is oxidized to furnish electrical energy. This discussion is largely theoretical, although attempts have been made at cell construction, despite the fact that oxidation with an air or oxygen electrode is notoriously slow. However, the author points out that in Germany 2×10^9 kilowatts could be generated annually from waste liquors now obtained. K. Schwabe, Papier-Fabr. 39, 129-32 (1941).

Hydrogenation of Lignin and Waste Liquors

A study was made of the hydrogenation of spruce lignin in the presence of alkali. With a pressure, at the outset, of 80 to 140 atmospheres (hydrogen) and using two temperatures—250 and 340 deg. C., the investigators found that at the higher temperature, lignosulphonates in waste liquors could also be hydrogenated. The purpose was to obtain if possible benzene, toluene, and ethylbenzene derivatives, and their hydrogenation products (i.e., hydrogen in the nucleus). The results were obtained by the action of alkali, together with the hydrogen activated by catalysts.

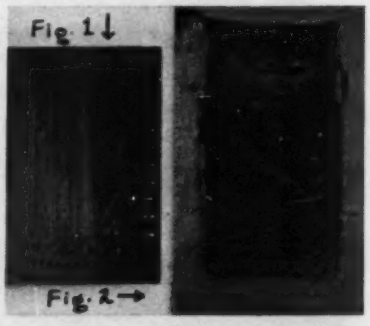
The authors assume three different reactions: (1) There may be the destructive action of hot alkali; (2) there is the cracking of side chains by hydrogen in the presence of NaOH, which is preferential as long as the benzene rings have not yet been hydrogenated; and (3) there is the random hydrogenation of propyl-benzene residues combined by ether linkages or by condensation.

The second type of reaction received the most study. Up to 5% NaOH was employed. With certain not too active catalysts, at 260 deg. C. the products were largely phenolic (i.e., 45-50%) and of these, 15% were monocyclic compounds like guaiacol, creosol, pyrocatechol, etc.). Smaller amounts of nucleus hydrogenated compounds were also formed. When very highly activated catalysts (like Raney nickel) were used, without changing other factors, nucleus-hydrogenated products (36-40%) were almost the sole products and these contained about 15% (based on lignin) of monocyclohexanols. At the higher temperature, nucleus hydrogenation is the chief reaction. Here, too, are formed considerable amounts of cyclopentanols (by ring contraction) as well as substituted cyclohexanols. Here the use of catalysts is of subordinate importance. These phenolic compounds are formed to the extent of 13-15%. The main fraction contains neutral products (40%, based on lignin) of which about 27% can be distilled and the greater part of which contains monocyclic alcohols.

Sulphite, waste liquor, or black liquor components are best hydrogenated at this higher temperature. Products are, in the main, similar to those obtained from lignin under similar conditions. Conditions are described for the hydrogenation of cuproxam and HCl-lignin using various catalysts, and of ligninsulphonates without catalysts, as well as the hydrogenation of individual compounds like guaicol, para-cresol, isoeugenol, etc. K. Freudenberg, Willy Lautsch, G. Piazolo, and A. Scheffer. Ber. 74B, 171-83 (1941) through C.A., 35, 4197-8 (1941).

Detecting Flaws in Digesters

This relates to new techniques used in examining digesters and their linings. The author gives the modulus of elasticity of various types of bricks and cements. Ceramic bricks are the least, and carbon bricks the most, elastic. Under certain conditions, the latter are well adapted to use in digester linings. Wehaven cement is most elastic with the single exception of the so-called "Elasplit," data on which are not available.



The prevention of fissures in digesters depends on reserve elasticity concomitant with which (but not a chief factor) is the initial expansion (Vorspannung) of digester linings. Digester failure may result when this initial expansion is too high or too low. With excessive inner heating, when expansion is too high, there is an overtaxing of the lining or shell or both. With excessive inner pressure, there may be too high an expansion resulting on an overstrained shell, or too low an expansion giving rise to fractured linings. With inner cooling, there may be an abnormally low expansion, with fissures in the lining. Due

to the change in shape of the digester, there may be too high or too low an expansion, in each case followed by fracture of the lining. All these possibilities are discussed in great detail.

An old commercial sulphite digester, which was thought to be in part corroded, was studied. By introducing an X-ray tube into the opening in the head of the digester, and using an X-ray transformer (wheeled up to the digester on the floor of the digester room), X-ray photographs of suspected portions of the shell could be taken. These indicated areas of corrosion were later verified by visual inspection of exposed interior of the digester shell. However, this technique is entirely too cumbersome, hence, various simpler methods were devised for gauging corrosion.

The author discusses the evolution of the method now in use. A large sensitive tube (connected with a millivoltmeter which can be read at a distance) is lowered into the digester opening. This tube (which is not fully described) is termed the Zählrohr," and is extremely sensitive to gamma rays. It takes the place of the photographic film in the cumbersome X-ray method. An observer who is studying the digester shell uses a rod, tipped by a capsule, containing a mesothorium preparation, which emits gamma rays, the slightest penetration of which into the interior of the digester is recorded through the Zählrohr by the voltmeter. As the observer passes the rod over suspected areas on the digester shell deflections by the voltmeter permit the accurate charting of weak spots. These can be indicated by chalk marks on the surface of the digester shell. How closely these chalk marks correspond to the paths of corrosion on the inner parts of the shell may be seen by comparing Figures 1 and 2. The former shows the tracing; the latter shows an actual photograph of inner corrosion. Rudolf Haas. Papier-Fabr. 39, 65-80 (1941).

The Electron Microscope in Following Cellulose Degradation

Cellulose treated with HCl and cellulose precipitated from cuprammonium solutions were examined by means of the Siemen's electron microscope which permits magnification to 13,000-30,000 diameters. Fibers that had been treated with HCl were either neutralized and dialyzed, or the suspension was diluted and dried on the microscope slide. Another method was to centrifuge the suspension, wash with water, and then dry. No conclusions can be reached regarding dialyzed samples or those dried in the presence of HCl. Their structure was indefinite. However, the centrifuged material showed promise. Here were rather well defined fibrils 10 to 100 mμ in width and 0.5 to 2.3 μ long. After 19 hours of acid treatment, long fibrils, 5 mμ in width, were obtained, and these corresponded roughly to the width of a cellulose micelle. This may be preformed in the cottonseed hair. Since these elements are several mμ longer than are the so-called Farr particles, the latter lose their significance as structural elements. H. Ruska and M. Kretschmer. Kolloid-Z. 93, 163-6 (1940) through C.A. 35, 3433-3434 (1941).

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PAPERMAKING PATENTS

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Clearing of Rolls

Patent No. 2,239,383. Pierre Drewsen, Sandusky, Ohio, assignor to The Hinde & Dauch Paper Company, Sandusky, Ohio, a corporation of Ohio. Application March 20, 1939, Serial No. 262,956. 4 Claims. (Cl. 91—51). In a printing stand having a bottom roll dipping into an ink fountain, an intermediate roll pressing thereon and a top roll pressing on said intermediate roll, adapted to ink a web running between the bites of all said rolls, means for removing ink from the arc of said intermediate roll not covered by said web, said means comprising a doctor blade bearing upon said arc.

Paper Winding Machine

Patent No. 2,237,759. George M. Kwitek, Green Bay, Wis., assignor of one-half to Edwin M. Kwitek and one-fourth to Reuben J. Pech, both of Green Bay, Wis. Application January 25, 1940, Serial No. 315,490. 16 Claims. (Cl. 164—68). In combination, a web feeder, a rotable turret, mandrils rotatably mounted on the turret and adapted in revolution thereon to approach successively the path of the web, a bed roll over which the web travels, and a cutter carried directly by the bed roll for severing the web, when the mandril reaches a predetermined position relative to the bed roll and web.

Apparatus and Process for Drying Waxed Paper

Patent No. 2,240,315. Cecil M. Rhodes and Lyle L. McGladrey, St. Paul, Minn., assignors to Rapinwax Paper Company, Minneapolis, Minn., a corporation of Minnesota. Application September 24, 1938, Serial No. 231,539. 5 Claims. (Cl. 34—18). The method of removing residual moisture from wax paper and cleaning the moisture removing means consisting of passing a sheet of moist wax paper between contacting soft surfaced rollers and scraping and applying a bath of cleaning fluid to the surface of said rollers for the purpose set forth.

Method for Making Coated Paper

Patent No. 2,237,068. Donald B. Bradner, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application August 27, 1938, Serial No. 227,096. 4 Claims. (Cl. 92—40). Process of making coated paper which comprises applying an excess of fluent coating composition, comprising a liquid vehicle containing pigment in suspension and adhesive, to a traveling web of paper which is absorptive to the liquid of the coating composition to a degree to form on the surface of the web a layer of firm filter cake from the pigment in the coating composition adjacent the web while the overlying coating composition remains fluent, and then after the formation of the layer of filter cake, yieldingly wiping off substantially all said fluent coating composition without removing substantially any of the filter cake, and firmly supporting the web on its other side at a location where the wiping is accomplished and thereafter drying the coated paper.

Method of Bleaching Kraft Pulp

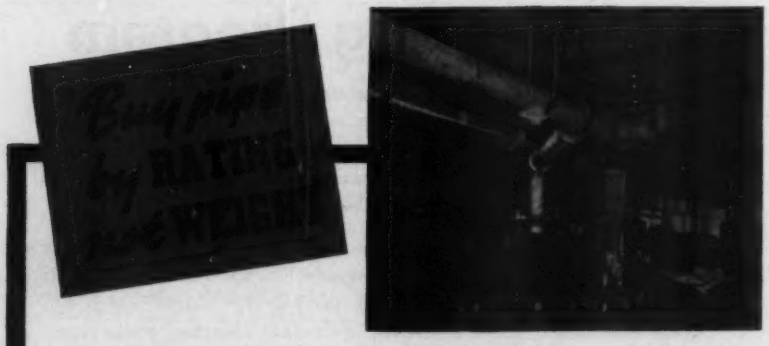
Patent No. 2,239,606. Edward H. Hill and Ralph Hooks, Covington, Va., assignors to West Virginia Pulp and Paper Company, New York, N. Y., a corporation of Delaware. Application August 25, 1938, Serial No. 226,676. 8 Claims. (Cl. 8—105). In a method of bleaching kraft pulp, the steps which comprise treating an aqueous suspension of the pulp with chlorine in an amount just sufficient to act upon substantially all the non-cellulosic constituents of the pulp and allowing the reaction to take place until substantially all the chlorinatable non-cellulosic matter has been reacted upon, then removing water-soluble reaction products from the pulp, treating the same with hypochlorite solution at a pH in excess of 3.5 and less than 7 and removing from the pulp alkali-soluble reaction products by treatment with an alkali solution.

Drier Felt

Patent No. 2,237,115. John R. L. Santos, Baltimore, Md., assignor to William E. Hooper & Sons Company, Baltimore, Md., a corporation of Maryland. Application May 16, 1939, Serial No. 273,935. 3 Claims. (Cl. 139—415). A drier felt having two layers of filling comprising a top layer having closely spaced filling threads, a bottom layer consisting of fillings in number equal to one filling thread for each two filling threads of the top layer, two sets of warp threads by which the alternate fillings of the top layer are interwoven with all the fillings of the bottom layer, an additional set of warp threads interwoven with and passing alternately over and under all the consecutive top filling threads and being free of the bottom layer, and a set of core warp threads passing between the fillings of the top layer and the fillings of the bottom layer.

Paper Winding Regulator

Patent No. 2,239,472. William T. Stanford, Oklahoma City, Okla., assignor to Vac-Control Manufacturing Company, Oklahoma City, Okla., a corporation of Oklahoma. Application May 8, 1939, Serial No. 272,441. 6 Claims. (Cl. 242—76). In an apparatus for winding a paper web



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from one roll to another, a supply roll, a re-winding roll, means for shiftably mounting the supply roll on its axis relative to the re-winding roll, and means controlled by the paper web for automatically shifting the supply roll while unreeling the web, said means comprising a regulator including a housing formed by a rigid wall and a flexible diaphragm enclosing a vacuum chamber, spring means for maintaining the diaphragm in normal position, a vacuum pump, a conduit from the pump to the diaphragm, a rod connected to the diaphragm and passing through said rigid wall, means for coupling said rod to the supply roll, a pilot device positioned beneath the path of the web and having an orifice adapted to be covered and uncovered by the edge of the web, and a tube for establishing communication between the pilot device and the said conduit.

Apparatus for Manufacturing Paper

Patent No. 2,241,554. Frank J. Lang, Niagara Falls, and Frank Adlai Walker, Tonawanda, N. Y.; said Lang assignor to International Paper Company, a corporation of New York. Application December 23, 1937, Serial No. 181,286. 1 Claim. (Cl. 91—48). A device for correcting localized deficiencies of liquid content occurring across the width of a moving web which comprises a rotatable roll in contact with said web and driven thereby, a container, means to maintain a supply of liquid in said container, and a series of individually removable wicks for transferring liquid from said supply to said roll, said series of wicks having an aggregate width equal to the width of said web whereby variations may be produced across the width of said web by the removal of one or more wicks.

Method and Apparatus for Controlling the Consistency of Paper Stock

Patent No. 2,242,419. Edwin Cowles, Hopewell, N. J., assignor to The Cowles Company, Princeton, N. J., a corporation of New Jersey. Application April 2, 1937, Serial No. 134,472. 5 Claims. (Cl. 137—78). Method of controlling the consistency of a flowing stream of paper stock which comprises withdrawing stock from said stream, thickening said stock to a degree proportionate to the thickness of the flowing stock, agitating said thickened stock, and adding more or less water to said flowing stream in accordance with the increase or decrease of work required to agitate said thickened stock.

Apparatus for controlling the consistency of a flowing stream of paper stock which comprises means for withdrawing a portion of said stream, means for agitating said withdrawn stock, means for thickening said withdrawn stock to a degree proportionate to the thickness of the flowing stock, means for registering variations in the power required to agitate said thickened stock, and means controlled by said last named means for increasing or decreasing the flow of water to said flowing stream in accordance with the increase or decrease in said power requirement.

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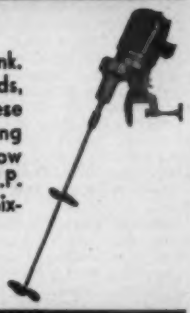

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New Catalogues, Ass'n Reports, and Publications

The Bristol Co., Waterbury, Conn.—A complete line of socket screws for all types of service is described and illustrated in this company's new catalogue. Illustrations, diagrams, and charts are used to explain the various types of screws, the prices, and their application. Charts are also used to show the various size threads that are available on the different size screws.

Brown Instrument Co., Philadelphia—Important facts and descriptions of the various types of air operated controllers are clearly and concisely illustrated and explained in a new 36-page catalogue just sent out by this company. An easily written style together with large, clear photographs of instruments and installation views are the outstanding feature of this catalogue. Many of the important operating parts are pictured individually besides a view of the general interior and exterior. Diagrams are also included showing the principle of operation.

Carrier Corp., Syracuse, N. Y.—"Heat Disposal," the title of the new publication just released outlines the theory, operation, and principal features of this company's complete line of evaporators. Using diagrams and photographs, the booklet explains in detail the methods of heat disposal from both airconditioning and refrigeration and from liquids and engine jacket water. Two pages are used to show typical installations of Carrier evaporative condensors in large and small establishments in the United States.

Cochrane Corp., Philadelphia—"Flow Meters by Cochrane" is the name of a new 52-page handbook on instrument application to steam, water, air, gas, and viscous, volatile, and corrosive fluid measurement. The efficient operation of boiler and turbine rooms and various process industries is discussed at length. Thorough description of important operating details are given on ten different types of instruments including the new Linameter for difficult-to-measure fluids, the ring-balance meter for low-pressure gasses, electrical and mechanical weir meters, and liquid level instruments. The construction features of the friction-free electric flow meter and the high-torque mechanical flow meter are explained in detail with full-size illustrations of these instruments showing the high readability of the 12-inch chart record, indicating scale, and totaling integrator.

Dits Machine Works, Fulton, N. Y.—A new 8-page bulletin describing in detail the construction and operation of the new tangential inlet Classifier contains dimensional diagrams of both the horizontal and vertical systems. The general specifications of the machine are outlined with illustrations, diagrams, and line drawings to give a clear picture of the machine itself and the operating features.

B. F. Goodrich Co., Akron, Ohio—A new 12-page catalogue section solves the problems of isolating vibration in machines by using the Vibro-Isolators, devices of metal and rubber which are used to cut down vibration and noise. This publication is excellently illustrated, both with actual installation pictures and engineers' drawings of each type of Vibro-Insulator. Applications of the mountings on various types of equipment are listed, together with a table of characteristics. Nine pages are devoted to listings of the fundamental data for each type of mounting, with a drawing of each one.

Harbison-Walker Refractories Co., Pittsburgh—A new color folder describing and picturing Korundal bricks has just been sent out. A two-page colored diagram shows the effect of heat on bricks with varying amounts of alumina and silica in their make-up. The mineral constitution, the chemical constitution, the volume stability, etc., are explained. The various sizes and shapes of the bricks are illustrated, to show the many applications.

Kills-McCanna Co., Chicago—An exceptionally well-prepared catalogue on Saunders Patent Long-Life Diaphragm Valves has just been issued. The first section of the book is devoted to the story of these valves and their advantages. Other information such as; application, operation, design, construction, 11 features of the valve, the different types, etc., is included. Diagrams and charts showing dimensions together with operating data and service recommendations are used. The catalogue is profusely illustrated.

Metropolitan Life Insurance Co., New York—Vital considerations in accident prevention brought about by the demand on industry during this national situation are discussed in a report issued by the Group Insurance Division of this company. The report, entitled "Conserving Men, Money, and Materials in Essential Industries" points out proper means of controlling industrial accidents and develops briefly several fundamental considerations for employee safety. Particular consideration is given to the subject of accident costs.

International Nickel Co., New York—Detailed reports on the value of five different metals in conditions involving corrosion and temperature extremes are covered in detail in the first of two booklets recently published by this company. Three of the 12 pages are devoted to illustrations and actual service records of springs made of the five metals. Additional pages contain technical data and tables on strength, stiffness, endurance, resistance to corrosion and corrosion fatigue, effects of high temperature, and magnetic and electrical properties. The booklet is entitled "Individualized Inco Nickel Alloys" and gives individual characteristics, mechanical properties, and application information on the Inco Nickel Alloys. Tables of physical constants and available forms are included.

Johnstone Engineering & Machine Co., Downingtown, Pa.—Uniform Tension Unwinders with auto-hydraulic brakes are described, pictured, and explained in a new booklet that has just been published by this company. The booklet is divided into sections dealing with the purpose, the development, the proven construction, the operating principles, the nerve roll, the hydraulic brake, etc. The two types, the air-cooled and the water-cooled, are described briefly as to differences.

Service Caster and Truck Co., Albion, Mich.—Announcement has just been made by this company in the form of a pamphlet of its new hydraulic paper roll truck. The operation of the truck is explained in detail with the use of illustrations. A well-written, simple description of how the truck is built together with an explanation of what it does is included. Advantages are also listed and illustrated.

Sprout, Waldron & Co., Muncy, Pa.—This company's Sprout-Waldron rotary disc mill, type 36-2, which is designed for pulp preparation is the subject of a bulletin (2200-P-2). A double-page schematic diagram shows the design of the machine. The application and principle of operation are also discussed.

Stearns Magnetic Mfg. Co., Milwaukee, Wis.—This company has just issued a new 16-page reference catalogue on magnetic pulleys and magnetic pulley separator units. Descriptive matter, illustrations, specifications, applications, and other important data are included in this booklet. A large two-page illustration is used showing the design and principle of operation of the machine.

Westinghouse Electric and Manufacturing Co., Pittsburgh—Single motor drives for the paper industry are described in a new 8-page bulletin (B-2279). Discussed in detail are the main motor drive elements; namely, an adjustable speed d-c motor for driving the lineshaft; a d-c generator supplying power to the motor; the necessary exciter unit, etc. The basic steps in the motor drive operation are explained, attention being given to relays.

Wheelco Instruments Co., Chicago—A valuable data book and catalogue for all thermocouple users has just been sent out by this company. Information such as temperature conversion tables, millivolt tables, pipe and wire sizes, decimal equivalents, wire resistances, recommendations for checking, etc., are all discussed. Prices and descriptions of the complete line together with illustrations and diagrams of many, are also included.

Books

Code for Measurement of Water Using Standard ISA Orifices with Free Discharge—Hydraulic Institute, 90 West St., New York City, has published this code. It was prepared by the Standards Committee of its Deep Well Turbine Pump Section, assisted by the Engineering Department of the University of California. In addition to the presentation of information covering application of the meter, and construction specifications, the code includes six flow rating charts for pipes from 4 in. to 12 in., and orifices from 1.600 in. to 9,000 in. Bound in paper cover, the code is priced at $1.00 a copy (free delivery within the United States) by the publisher.

Lange's Handbook of Chemistry (Fourth Edition)—A book of more than 1900 pages, attractively and durably bound in a blue fabricoid cover, this volume is a splendid working tool for any chemist, physicist, or other individual who has need for material of the kind it contains. It is a compilation of a wide variety of factual data, the new tables and extensions alone requiring the addition of 85 pages over the previous volume. Likewise, changes in standing matter have been made to keep the work accurate and up-to-date. The tables offered for the first time include: synthetic rubbers; correction of the boiling point for pressure; calculation of the boiling point of organic compounds; qualitative spectrographic analysis; sensitive lines of the elements; Hammond's cuprous oxide and copper equivalents of sugars; conversion of specific gravity to density; azeotropic mixtures; tank and pipe capacities; logarithms of factorial n, factorials; and binominal coefficients. With a page size of 5¾ by 7¾ inches, the book carries more than 3,000 index entries, arranged two columns to the page and covering 35 pages. The book is priced at $6.00 a copy by Handbook Publishers, Inc., Sandusky, Ohio, the publisher.

The Theory of Cellulose, Vol. I. This volume was published in Torino, Italy, in 1939. Its author, Mario Michels, presents it as an introduction to the study of cellulose. Citations are made to over 200 investigators in the field of cellulose dating from Payen to Mark. Although a list of the authors referred to is presented, the specific publications in which the information was sought are not mentioned. A bibliography is entirely lacking. The volume contains 232 pages of written material and a large number of illustrations such as; charts, X-ray photos, tables, graphs, and schematic representations. As designated by the table of contents, the topics treated are as follows: Generalities on the morphology, physical characteristics, and

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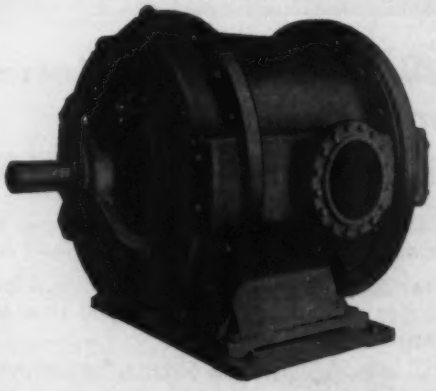

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elementary characteristics of cellulose; The action of acids, alkalis, and cuprammonium hydrate on cellulose; Aspects of colloid chemistry that touch on cellulose; Mechanical action on cellulose; Degradation and destruction of cellulose by the action of acids, bases, oxidizing agents, bacteria and enzymes; Effects of dehydration and decomposition; The origin of cellulose; The problems of molecular weight and molecular structure; Viscosity; Shape of the molecule and association of the filiform molecule; Ethers and esters of cellulose; Valence angles, atomic distances, molecular elasticity, state of aggregation, and law of periodic addition; Aspects of native cellulose; and Morphological characteristics of cellulose from conifers, hardwoods, grasses, monocots and dicots. Printed by G. B. Paravia & Co. Price, 150 lire.

Association Reports

National Defense—Priorities—Under date of August 8, E. W. Tinker, executive secretary of the American Paper and Pulp Association, sent to paper and pulp manufacturers a report consisting of 26 pages, issued by the Division of Priorities of the OPM in the field of critical metals and certain chemicals. Most of the items covered in these orders are important to the pulp and paper industry. The material in these reports is a summary of priority action taken so far by the Priorities Division. It is divided into two parts: (a) A brief summary of basic instruments and controls now being used by the Priorities Division. (b) A set of summaries of the individual orders which impose mandatory industry-wide control on the distribution of scarce materials.

Paperboard Prices—The Office of Price Administration and Civilian Supply met with a group of Eastern paperboard manufacturers in Washington on August 1, and on August 6, Leon Henderson sent a detailed report of price increases to paperboard manufacturers and consumers. His office concluded that fair and reasonable prices for basic grades of paperboard should be increased $2.50 per ton over the prices established by individual agreements with this Office in June of this year. These previous prices were based upon the cost of wastepaper as of May 29, 1941, which cost has increased three to four dollars per ton. All of the individual representatives present agreed to the change and accepted as the maximum prices to be in effect until October 1, 1941, for manufacturers east of the Rocky Mountains the following prices:

	Per ton
Chip board	$45.00
Single manila lined board	60.00
White patent coated news board	75.00

The OPACS is now undertaking a study of the price structure of cylinder kraft board with a view to recommending differentials to apply to this class of merchandise.

In order to give full effect to this agreement and to aid in stabilizing conditions in the paperboard industry, announcement of the agreement is being sent to each producer and consumer of these products. In addition, all those in the industry are being asked to report to the Office of Price Administration and Civilian Supply any sale or offer for the sale of the board mentioned above, of which they have knowledge, at prices in excess of those covered by the agreement. The receipt of such information will enable this Office to take appropriate action.

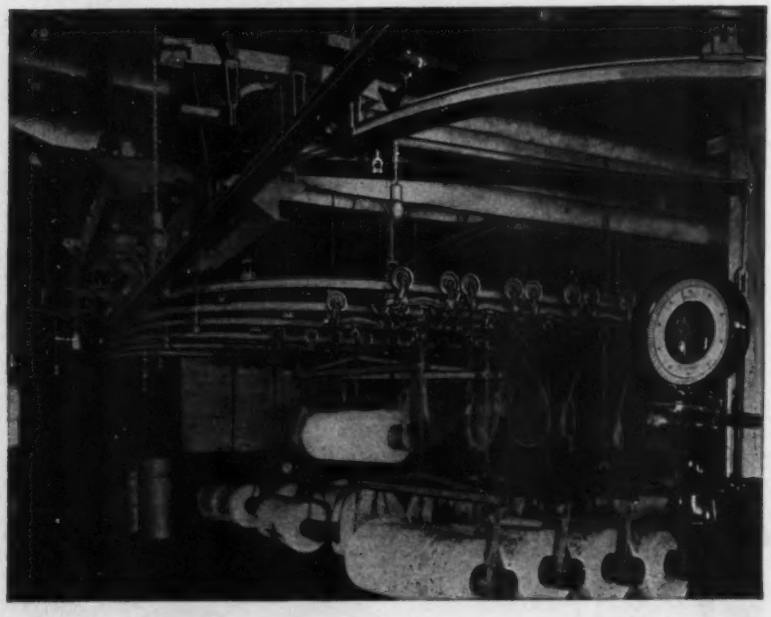
Imports and Exports—Monthly Statistical Summary for June, 1941—On August 21, E. W. Tinker, executive secretary of the American Paper and Pulp Association, sent to all paper and pulp manufacturers a summary of preliminary import and export data for June, 1941, just received from Washington. Wood pulp imports during June reached a total of 105,031 tons, the highest level reached since the virtual elimination of imports from Europe early in 1940. Wood pulp exports amounted to only 14,231 tons, the lowest tonnage exported since August, 1939.

Pulpwood imports amounted to 209,852 cords, an increase of 62 per cent over the month of May.

Newsprint Statistics—July production figures released by the News Print Service Bureau on August 11, show that production in Canada during July, 1941, amounted to 293,483 tons and shipments to 300,236 tons. Production in the United States was 83,199 tons and shipments 84,641 tons, making a total United States and Canadian newsprint production of 376,682 tons and shipments of 384,877 tons. During July, 29,292 tons of newsprint were made in Newfoundland, so that the total North American production for the month amounted to 405,974 tons. Total production in July, 1940, was 445,287 tons.

The Canadian mills produced 60,059 tons less in the first seven months of 1941 than in the first seven months of 1940, which was a decrease of three per cent. The output in the United States was 6,745 tons, or one and one-tenth per cent more than in the first seven months of 1940; in Newfoundland production was 3,484 tons, or one and seven-tenths per cent more, making a net decrease of 49,830 tons, or one and eight-tenths per cent less than in the first seven months of 1940.

Stocks of newsprint paper at the end of July were 159,145 tons at Canadian mills and 10,623 tons at United States mills, making a combined total of 169,768 tons compared with 177,963 tons on June 30, 1941, and 189,643 tons at the end of July, 1940.



Eliminate Damage Losses—Cut Costs with this method of

WAX PAPER HANDLING

Damage caused by "slam-bang" methods of hand-handling rolls of wax paper runs costs up and seriously nicks the profit column.

Easy operating Cleveland Tramrail eliminates damage losses—and in addition reduces handling time and increases storage capacity.

The system illustrated handles paper to winder, printer, waxing machines and storage. Scale incorporated in track makes weighing easy.

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"NON-USERS ARE THE LOSERS"

TENAX FELTS

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Defense Signals Fly

This year's program includes the vitally important defense-war demand for increased production,—Speed —More SPEED. The makers of Tenax Felts join in this "all-out" endeavor. They suggest you clothe your machines with durable TENAX FELTS, specially designed for maximum Water Removal at the presses, Full and True Trim, Long Life, and SPEED. Adopt Tenax Felts and help Defense!

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LOCKPORT FELT COMPANY

NEWFANE, N. Y., U.S.A.

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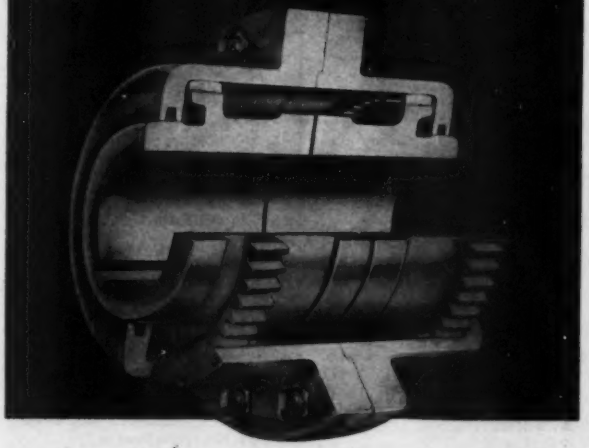

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FLEXIBLE COUPLINGS

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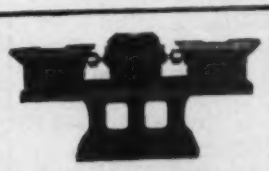
WOOD CLEANING EQUIPMENT

KNOT DRILLS

Wood Room equipment that keeps pace with the changes in the industry, backed by experience and service.



WOOD CLEANERS

Shown here are three items. Send for complete details on Murray wood cleaning equipment—and paper mill equipment too.

KNOT SAWS

D. J. MURRAY MFG. CO.

Wausau, Wisconsin

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS

	per cwt.
Blue Overalls	5.00 to 5.25
Corduroy	2.50 to 2.75
Cottons—	
Washables, No. 1	2.25 to 2.50
Fancy Percales	3.75 to 4.00
New Soft Blacks	3.50 to 3.75
New Light Seconds	2.00 to 2.15
New Dark Seconds	1.75 to 1.90
Khaki Cuttings—	
Mixed	2.50 to 2.75
O. D.	3.00 to 3.25
New White Canvas	7.50 to 8.00
New Mixed Blacks	2.50 to 2.75
Shirt Cuttings	
New White No. 1	7.00 to 7.25
Silesias No. 1	4.75 to 5.00
New Unbleached	7.00 to 7.25
Fancy	2.60 to 2.80
Linen Cuttings—	
White	12.50 to 13.00
Grey	12.00 to 12.50

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	1.45 to 1.55
No. 2	1.15 to 1.25
No. 3	1.05 to 1.10
Twos and Blues—	
Repacked	1.75 to 2.00
Thirds and Blues—	
Repacked	1.40 to 1.60
Miscellaneous	1.20 to 1.35
Whites, No. 1—	
Repacked	3.25 to 3.75
Miscellaneous	2.75 to 3.00
Whites, No. 2—	
Repacked	2.50 to 2.75
Miscellaneous	2.00 to 2.25

RAGS (Foreign)
ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shoppers	

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	4.50 to 4.75
Wool Tares—	
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	4.00 to 4.25
Manila Rope—	
Foreign	6.00 to 6.50
Domestic	6.00 to 6.50
New Burlap Cuttings	4.75 to 5.00
Jute Threads—	
Foreign (Nom.)	6.00 to 6.50
Domestic	5.50 to 6.00
Strings—	
Sisal	3.25 to 3.50
Soft jute	4.00 to 4.25
Mixed	1.25 to 1.50

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	3.75 to 3.90
Ord. Hard White No. 1	2.85 to 3.10
Ord. Soft White No. 1	2.60 to 2.85
Soft White, Extra	3.25 to 3.50
Flat Stock—	
Stitchless	1.55 to 1.65
Overissue Mags	1.40 to 1.50
Solid Flat Book	1.30 to 1.40
Crumpled No. 1	1.20 to 1.30
Solid Ledger Books	2.50 to 2.60
Ledger Stock—	
White	2.25 to 2.35
Colored	2.00 to 2.15
New B. B. Chips	.60 to .65
Manilas—	
New Env. Cuts	3.15 to 3.35
New Cuttings	2.35 to 2.50
Sulphite Mill Wrappers	.60 to .70
No. 1 Old Kraft	2.00 to 2.25
Old Corrugated Boxes	*.82½-
News—	
No. 1 Wh. News Cuttings	1.65 to 1.75
Strictly Overissue	.75 to .80
Strictly Folded	*.65-
No. 1 Mixed Paper	*.57½-

*OPACS Ceiling Prices

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.75-
Ground, cwt.	3.50-
Powdered, cwt.	3.90-
Blanc Fixe—	
Pulp, bulk, ton	35.00 to 42.00
Dry, barrels, pound	.0300 to .0400
Bleaching Powder—	
Drums, cwt.	2.00 to 3.00
Casein (Domestic Standard)—	
30-30 mesh (bags), lb.	24.00 to 25.00
80-100 mesh (bags), lb.	24.50 to 26.00
Argentine, lb.	24.00 to 24.50
China Clay—	
Domestic Filler Bulk (mine) ton	7.50 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	15.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	1.75 to 1.90
Gelatine (silicin), lb.	.70 to .75
Glye. (C.P.) drums, lb.	.1450 to .1500
Litharge, powd., bbl., lb.	.08¼ to
Rosin (Gum)—	
New York, per 100 lbs.	
E	3.11-
F	3.12-
G	3.13-
WW	4.57-
Rosin (Wood), carlots	2.50-
Salt Cake—	
Dom. bulk (wks) ton	16.00 to 17.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—Ammonia,	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10-
Pearl, barrels, cwt.	3.20-
Paper (Sp.) bags, cwt.	3.20-
barrels, cwt.	3.30-
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	15.00 to 20.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	.07¾ to .08

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached, contract	3.30 -
Open market	3.40 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	4.25 to 4.50
Kraft No. 1	3.50 to 3.75
Kraft, Southern, del.	3.25 to 3.50
Sulphate (Imp.) on dock—	
Bleached	(nominal)
Kraft No. 1	(nominal)
Kraft No. 2	(nominal)
Sulphite (For.)	
On dock—	
Prime bleached	(nominal)
Prime easy bleach	(nominal)
Prime strong unbl.	(nominal)
Sulphite (Dom.)	
Bleached, contract	3.62½ -
Bleached, open market	3.85 -
Unbleached, contract	3.17½ -
Unbleached, open market	3.35 -

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. pulp mill)	31.00 to 34.00
No. 1 Imp. (On dock)—	
Moist	—
Dry	—

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	78.00 to 82.00
Chip	45.00-
Chip, sgl. mls. lined	90.00-
Coated, white patent .016	80.00-
.020 and heavier	75.00-
Kraft liner	65.00-
News	45.00-

	per cwt.
Book (coated)	
No. 1 Coated	14.75-
No. 2 Coated	13.50-
No. 3 Coated	12.50-
No. 4 Coated	12.00-
No. 2 Offset	11.00-
A Grade Super	10.00-
B Grade Super	9.50-
Bonds (Rag Content)—	
100% Rag Ext. No. 1	43.50 to 46.00
100% Rag	40.25 to 46.00
85% Rag	
75% Rag	26.85 to 27.75
65% Rag	
50% Rag	20.15 to 22.00
25% Rag	17.55 to 19.25
Regular Colors	1.00 cwt. extra
Bonds (Sulphite)—	
No. 1	11.70-
No. 2	10.75-
No. 4	9.90-
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	14.00 to 14.25
Bleached (25 lb. up)	12.75 to 13.00
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	10.75 to 11.25
Unbleach. (25 lb. up)	10.00 to 10.50
Ledgers (Rag Content)—	
100% Rag Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	13.00-
No. 2	12.05-
No. 4	8.50-
News—	per ton
Rolls (Contract)	50.00-
Rolls (Spot)	(nominal)
Sheets	53.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	97½ -
White, No. 2	.75 to .77½
Anti-Tarnish M. G.	.90 to 1.05
Colored	1.00 to 1.10
Kraft	.85 to .90
Manilla	.80 to .85
Napkins, semi-crepe (12¾ lb. to M shts.) per cs	.46 -
Napkins, full crepe and emb'sed (12¾ lb. to M shts.) per cs.	.50 -
Toilet, Bleached (M shts.) per cs	3.80 -
Toilet, Unbleached (M shts.) per cs	3.80 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.95 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	6.00 to 6.50
Super-Standard	5.00 to 5.50
Northern Standard	4.50 to 5.00
Southern Standard	4.50 to 5.00
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F.& M.G. Waxing, 20 lb. (Carloads only)	7.00 to 7.25
(10,000 lbs.)	7.25 to 7.50
Drug wrapp. 35 lb.	6.50 to 6.75
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.00 to 5.25
No. 1 Butchers	5.50 to 5.75
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.00 to 6.25
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	5.62½ to 5.87½
Steam Finish, 50 lb.	4.50 to 4.75
Water Finish, 40 lb.	5.00 to 5.25
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	5.50 to 5.75
Envp. Mla., Sub. 16-28 (No. 2)	5.25 to 5.50
Envp. Mla. (Prices based on large sheets untrim'd reams marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.75 to 6.00
No. 2	5.50 to 5.75
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	6.25 to 6.50
Grade B-25 lb.	6.00 to 6.12½